The Chemical Age

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Works Practice for Students

IN providing a number of university chemical students with an opportunity for a vacation training course at their Blackley works, the British Dyestuffs Corporation have set an excellent example to other large chemical concerns. At the last annual meeting of the Chemical Society, Professor Wynne reminded the chemical industry of the arrangements for enabling metallurgical students to acquire direct works experience in some of the great Sheffield steel works, and appealed to its leaders to extend the same facilities to chemical students. If others follow the B.D.C. lead in this direction, presently what is now exceptional may become the normal practice, with beneficial results to both interests affected. For the Blackley experiment a dozen students were selected from various educational centres and they spent some weeks in going through six departments—costing, engineering, technical research, azo colours, dyehouse, and central analytical laboratory. The experience was probably sufficient to change a purely theoretical into a practical conception of what dyestuff production means. From the point of view both of the students attending and of those members of the staff who directed it the experiment is considered to have been sufficiently successful to ensure its repetition, possibly on a larger scale, next summer.

Not only are the details of this scheme of considerable practical interest, but the spirit behind it is even more important. The object in view is to bring the universities and technical schools into the closest and most sympathetic relation with the industry. In a circular recently issued to university professors, the latter were invited to bring to the Corporation's notice students of exceptional ability suitable for research departments or works processes, as well as, in their early stages, researches in the university laboratories which are likely to have an industrial application. Further, the professors were invited to allow certain members of the Corporation's research staff to discuss or even to work on problems with the university staff, and to allow their students to engage in researches in conjunction with the Corporation or to make investigations which, though not of immediate technical importance, may yet extend knowledge in these fields. All this seems to us to be in the best possible spirit. The range of vision includes not merely industrial results, admittedly important as these are, but primarily the development of fundamental science which must precede and underlie all the practical applications. In practice it means the substitution of a complete fellowship of all classes of workers, from the most abstract to the most practical, for a system that isolates them into a series of castes, whose etiquette hardly allows of a nodding acquaintance.

Lower Wages or Higher Efficiency

THE Chemical Joint Industrial Council, in deciding to defer until January next the question of a wage reduction throughout the chemical industry, have set an excellent example both to manufacturers and to workpeople. The representatives of both sides have agreed to appeal to the employees to co-operate with the employers to secure elimination of waste and greater productive efficiency, in the hope that this will avert any necessity for wage reductions. Notices are to be posted in all chemical works throughout the country, and Mr. Lloyd Roberts, as the representative of the Chemical Employers Federation, expresses the hope that the three months experiment will provide a better way of solving the present difficulties than that of cutting down wages. The trade union representatives, it is stated, have promised their full assistance.

This experiment is distinctly promising. It recognises that the return which industry must yield both to the workers and to the employers—who are also workers, often with very much harder work and

heavier responsibilities than those they employ—is only possible when an industry is run successfully. If an industry cannot pay its way, equally it cannot continue to be run for ever at a loss. When it comes to an end both the employers and the workmen suffer from the discontinuance of their means of livelihood. Both may prolong the process of extinction for a time by agreeing to accept less return than their labour merits, but the real remedy in such a case lies in bringing the industry up to such a state of efficiency as to provide a living return to both. That can only be done by getting both to recognise that they are partners in the business, to work heartily together for its success and to take fair proportions of the return. The Joint Industrial Council for the chemical industry has done a good service in bringing both parties to an agreement on this point, and the experiment they have decided on will be watched with real interest and sympathy.

This policy emphasises two points which in the present state of national industry it is wise to keep constantly in mind. The workers, to begin with, must realise that the fund from which wages is drawn is not an inexhaustible reservoir, but one they must themselves replenish if the supply is not to dry up. We are afraid it must be said that some of the trade union regulations, adopted perhaps originally as necessary or protective measures, have been pushed far beyond their proper limits, and are actually operating in favour of waste and inefficiency, to the annoyance of the good craftsman who takes a pride in his work. Regulations that lessen efficiency or output are in the end as much against the interests of the worker as against those of the employer, and there is need for discriminating to-day between regulations really needed to secure fair conditions to the worker and those that merely fetter his efficiency. Similarly, the employer who is not particularly up-to-date and looks at once to a wage reduction as the natural remedy in times of difficulty, needs to widen his outlook. When employer and employed both combine honestly to make a success of their industry by the best workmanship and the best methods, they are taking the surest means of securing what both equally desire. The co-operative experiment now arranged between chemical employers and chemical workmen is, therefore, one to be warmly commended.

Low Productivity in Chamber Plant

THE chamber system of sulphuric acid production in its customary form has always been, and is always likely to be, assailed on account of its low productivity per unit volume of chamber space. Viewed from the standpoint of modern demands, the normal chamber plant can scarcely be said to pass muster, and it may be anticipated that as existing installations fall due for renewal they will in all probability be succeeded by modern plants designed to give greatly increased rapidity of reaction, or at least they will be equipped with those auxiliary features that operate to the same end. It is, in fact, more or less certain that within the comparatively near future the introduction will be witnessed of considerably smaller units of plant capable of giving much greater reliability and elasticity than the old-fashioned chamber system, and at the same time reducing the degree of supervision which is at present demanded. One can trace the gradual improvement which has been effected in recent years, first by the Benker-Millberg system, which halved the time factor of the old chamber system, then by the Mills-Packard method, which reduced it to 25 per cent. of that originally required, and most recently by such devices as the Schmiedel roller box and the Metro bubbler, which are calculated to work at the phenomenally low time factor of a couple of minutes.

The drawbacks, if such they may be called, of these modern systems is, however, that they demand the erection of entirely new plant or the introduction of power-driven devices, and they do not, therefore, exactly provide a solution for those manufacturers already equipped with chamber plant still having a good many years of working life before it. We are frequently asked as to how productive capacity may be improved without necessitating any considerable structural modification or monetary outlay. Assuming that the plant as it stands is being operated under optimum conditions by those in charge, then the question is not particularly easy to answer. There is, however, little doubt that the absence of really satisfactory mixing of the reacting gases in the chambers is a cause of low productivity, and that matters may be improved by introducing means which will ensure more efficient circulation. Some years ago Meyer recognised this fact and introduced his tangential system of chambers, while Falding followed with still greater improvements. At the moment, however, we are concerned rather with some simple device capable of rapid and cheap installation, and it is more than probable that those who are interested in the matter may have forgotten the arrangement for effecting vigorous circulation of the gases which was suggested by the Chief Inspector under the Alkali Acts in his report for the year 1909. This device, which is simplicity itself, was used at some works with quite satisfactory results, and we feel that it is well worth reconsideration.

An American View of Fuel Research

THE opinion of such an authority as Dr. Fieldner of the U.S. Bureau of Mines, which he expressed to the American Chemical Society in his paper published in this issue, that British investigators lead the world in fundamental scientific research on low-temperature carbonisation, is a tribute of which we may be justly proud. This is no mere compliment, but is his considered judgment after an exhaustive personal study of the position of fuel research in Europe. Dr. Fieldner further says that the same vigorous opinions on the economic possibilities of low-temperature carbonisation that prevail in the United States are found in this country, and anyone who is familiar with the American outlook on such questions will appreciate the added significance of this statement.

As we have the largest Government fuel station in the world our predominance in this field of research is not unnatural, but it makes it all the more necessary for us to use this advantage to the full. That we fail in this respect compared with other countries, however,

is the conclusion of this American authority, who says that " to an outside observer it appears that the gas and coke oven industry of England does not keep so closely in touch with the Fuel Research Station as is done in America," where the Government had established a fuel testing plant in 1903 to investigate the combustion of coal. American power plant operators were quick to take advantage of the results of this research, and the tremendous progress made in modern American power plants has been the inevitable outcome. In Germany also the close co-operation of the universities and the industries is most marked, and the working staffs of these institutes are largely made up of university students who are doing their post-graduate work. The German Gas Association also maintains a research institute for the study of coal and technical teaching, the director of this organisation carrying on research with the aid of advanced students.

The work that Professor Cobb and his staff are similarly doing in conjunction with British gas interests is, of course, of the greatest value to the industry, but notwithstanding the excellent work that is being done at Leeds University and elsewhere, there is not yet as much co-operation between academic and industrial chemists as could be desired. Attention is drawn in another column to the successful experiment conducted by the British Dyestuffs Corporation in arranging vacation works practice for university students, and it is along these lines, coupled with closer co-operation between industrial and Government research institutions, that we may hope for a successful outcome of the fuel problems with which this country is faced.

Harnessing the Sun

WHATEVER justification there may be for some of the opinions ventilated recently in our correspondence columns as to the inability of the average technical man to express his ideas in writing, there can be no gainsaying the fact that amongst those who have sought science as a vocation there is a little band of creative thinkers and idealists who from time to time show themselves as masters of scholarly exposition. It would be invidious to single out those who time and again have shown themselves to be accomplished stylists, capable, without apparent effort, of weaving a series of comparatively commonplace scientific facts into a romantic story. At least, however, Dr. W. B. Parsons is sure of a place among them, and once more he has given us a delightful essay—we will not call it a paper—on " Some Future Problems in Engineering " in the current issue of the *Journal* of the Franklin Institute. Dr. Parsons commences by acquainting us with those secret forces of nature which as yet we have failed to turn to our benefit—the power of the tides, of breaking waves, and shifting winds. Most intriguing, however, is his vision of the utilisation of solar heat, which may be placed on a less problematical and entirely different footing.

" Here," says Dr. Parsons, " is a stupendous amount of energy going to waste," and although it is no new idea to transfer into useful work the power stored up in the solar rays, a satisfactory solution of the problem has absorbed but baffled scientists for centuries. Success at appallingly low efficiencies has certainly been achieved, but little is to be expected from principles dependent upon the evaporation of water and the production of low-pressure steam. One plant operating on this principle was, as a matter of fact, put to work in Egypt some twelve years ago and succeeded in driving a small steam engine. Dr. Parsons has other views as to the means of recovery that should be employed. Success will not lie by way of changing water into steam, but in finding some method whereby solar energy can be converted directly into power, or in making substances that will produce power. Our minds must be entirely freed, therefore, of existing methods, and we must begin to think in new terms. Nature has, in the growth of plants, pointed a way for man to follow and surpass her, and it rests with the scientist and engineer, calling physics and chemistry to his aid, to find means of storing solar energy until such time as it is needed for conversion into work. Dr. Parsons throws out encouragement by asserting that there is room for reasonable confidence that success will ultimately be achieved. It is not, however, his speculations, and the revolutionary influence which their fulfilment would have on the particular technical sphere which we represent, that attract us, but the picturesque way in which he tells his story.

Books Received

ANNUAL REPORT OF SALFORD BOROUGH ANALYST FOR THE YEAR 1924. By G. D. Elsdon, Municipal Laboratories, Salford.

COPPER. By N. E. Crump. London : William Rider and Son, Ltd. Pp. 246. 10s. 6d.

HEXOSAMINES AND MUCOPROTEINS. By P. A. Levene. London : Longmans, Green and Co. Pp. 163. 10s. 6d.

REPORT ON THE ECONOMIC SITUATION IN ANGOLA (PORTUGUESE WEST AFRICA). By A. B. Hutcheon. Department of Overseas Trade. London : H.M. Stationery Office. Pp. 37. 1s. 6d.

REPORT OF TEST BY THE DIRECTOR OF FUEL RESEARCH ON THE CARBONISATION PLANT OF MIDLAND COAL PRODUCTS, LTD., NETHERFIELD, NOTTINGHAM. Department of Scientific and Industrial Research. London : H.M. Stationery Office. Pp. 23. 9d.

THE CHEMISTRY OF POWER PLANT. By W. M. Miles. (The Chemical Engineering Library. Second series.) London : Ernest Benn, Ltd. Pp. 144. 6s.

THE DESIGN AND ARRANGEMENT OF CHEMICAL PLANT IN ITS RELATION TO ITS ECONOMIC CONTROL. By Geoffrey Weyman. (The Chemical Engineering Library. Second series.) London : Ernest Benn, Ltd. Pp. 140. 6s.

The Calendar

Oct. 26	Institute of Chemistry (Manchester Section) : Annual General Meeting. An account of the discussion on " The Registration of Chemists " at the York Conference will be given by Mr. F. Scholefield.	Manchester.
27	Royal Photographic Society : Annual Dinner.	Holborn Restaurant, London.
28	Society of Chemical Industry (Newcastle Section) : " The Phenomena of Intensive Drying and their Significance." Professor H. V. A. Briscoe. 7.30 p.m.	Armstrong College, Newcastle-on-Tyne.
29	Institute of Chemistry (Glasgow Section) : Annual General Meeting.	Glasgow.
30	The Manchester Literary and Philosophical Society.	Manchester.
31	British Association of Chemists : Eighth Annual General Meeting. 3 p.m.	Midland Hotel, Manchester.
Nov. 3	Institute of Chemistry and Society of Chemical Industry (Edinburgh Sections) : Inaugural Address by Dr. J. F. Tocher. 8 p.m.	North British Station Hotel, Edinburgh.

The Alkylation of Amines and Phenols

The introduction of alkyl groups into aromatic amines has become a most important process as a result of the extensive utilisation of secondary and tertiary amines in the preparation of dyestuffs, pharmaceutical products, etc., and much work has been directed in recent years towards the simplification and cheapening of this process.

THE original method of alkylation consisted in heating the hydrochloride of the amine under pressure, with an alkyl iodide. This is obviously useless as a commercial process, though a similar method using an alkyl chloride has found a moderately wide application. The disadvantage of this process lies in the fact that methyl chloride is a gas and ethyl chloride a very low boiling liquid, and the volatility of these materials introduces practical difficulties into the manufacture. A description of the preparation of dimethyl aniline from aniline and methyl chloride is given by Grandmougin (*Revue des Produits Chimiques*, 1917, 68). The process consists in mixing aniline (1 molecule) with milk of lime (1 molecule) in an autoclave and passing in methyl chloride (2·3 molecules) at a temperature of 100°. The pressure gradually falls, and, when it remains steady, the process is at an end, the dimethyl aniline being removed by steam distillation. Ethylation can be carried out in a similar manner.

Of much greater importance, however, is the process in which the alcohol itself is heated under pressure with the amine in the presence of a little sulphuric or hydrochloric acid. Methyl and dimethyl aniline are prepared by the action of methyl alcohol on aniline in the presence of sulphuric acid. The difference between these two preparations lies in the fact that with dimethyl aniline a much larger amount of methyl alcohol is used and the reaction is carried out at a somewhat higher temperature. But it is always found that, whereas the tertiary amine is easily prepared in a state of purity and with a good yield, when it is desired to obtain a secondary amine the product invariably contains some primary and tertiary amine. Methods have, therefore, been devised for separating the three classes of amines, and also for the preparation of secondary amines by indirect methods which avoid the possibility of the formation of tertiary bases.

Dimethyl Aniline

The preparation of dimethyl aniline consists in heating aniline with about its own weight of methyl alcohol and 15 to 20 per cent. of its weight of sulphuric acid for seven hours at 200–210° C. in an enamelled autoclave. The product is neutralised with soda and the oil distilled. The yield of dimethyl aniline (98–99 per cent. pure) is 96 per cent. of the theoretical. The amount of methyl alcohol used corresponds to nearly three molecules to each molecule of aniline. The same method can be used for the preparation of mono methyl aniline if only 1·1 to 1·2 molecules of methyl alcohol be taken and the temperature is kept at about 180° C. In this case, however, the product rarely contains more than 80 to 85 per cent. of mono methyl aniline, the remainder consisting of aniline and dimethyl aniline. Hydrochloric acid may be used in place of sulphuric acid, but appears to be less satisfactory. The preparation of ethyl and diethyl aniline follows a course very similar to that of the methyl compounds, but so far the results do not appear to be so good. Sulphuric acid is rarely used, as hydrochloric acid gives much better results.

It has been stated that the addition of a small quantity of iodine to the amine and alcohol mixture results in an increased yield and a purer product (D.R.P. 250,236). Methyl iodide has also been suggested, and seems to act in a similar manner (E.P. 145,743). A method which appears to work satisfactorily, and which is very adaptable for large scale work, is the catalytic method of Mailhe (*Comptes Rendus*, 1918, 467). The vapours of aniline and methyl alcohol are passed over alumina heated to 400 to 430° C.; the issuing gases are condensed and the product fractionated. The product generally contains some mono-methyl aniline, but on repassing over the catalyst with the addition of a little more alcohol, a very pure dimethyl aniline is obtained. Since methyl alcohol has become so cheap this method appears promising for large-scale manufacture. Dimethyl sulphate and diethyl sulphate are also used for the alkylation of aromatic amines. The latter is less used than the former owing to the fact that its preparation appears to be a matter of some considerable difficulty, though several recent patents have introduced fresh methods and improvements (D.R.P. 404,173, 397,685; E.P. 215,000, 216,368, 209,722).

The alkyl esters of toluene *p*-sulphonic acid have found a fairly wide application in the alkylation of amines. They are easily obtained by the action of toluene *p*-sulphonic chloride on the alcohol in the presence of caustic soda at the ordinary temperature. Dimethyl aniline may be prepared by treating aniline with two molecules of toluene *p*-sulphonic methyl ester, either alone or in the presence of an equivalent quantity of sodium carbonate (*Ann. Chim. Appl.*, 1925, 41). The yields obtainable by this method are generally good.

It has been already indicated that it is more difficult to obtain a secondary amine pure and with a good yield than is the case with a tertiary base. Some methods have been elaborated for the dealkylation of tertiary bases with the object of preparing secondary amines. This can be effected by heating the tertiary amine with aniline hydrochloride either under a reflux or in an autoclave. If dimethyl aniline be heated in an autoclave for six hours with an equivalent quantity of aniline hydrochloride at 200°, methyl aniline is obtained, although the yield is only 55 per cent. (*J.C.S.*, 1919, 204). A recent patent (U.S.P. 1,411,683) has described the dealkylation of tertiary bases to secondary, the method being to reflux them for some hours with an equivalent quantity of acetyl chloride. The alkyl chloride is formed and is disengaged, while the acetyl compound of the secondary amine remains behind.

A New Alkylating Agent

The action of a new alkylating agent has been described by Lazier and Adkins (*Jour. Amer. Chem. Soc.*, 1924, 741). This is aluminium alkoxide, which is prepared by boiling the dry alcohol with aluminium mercury couple for 24 hours, after which the product is dissolved in dry xylene and distilled in vacuo. A number of alkoxides of this nature were prepared and used for the alkylation of aniline. The procedure is to heat the aluminium compound with about one and a half times its weight of aniline under pressure to 350° for four hours. A good yield is obtained of mono methyl aniline of 91 per cent. purity, which can be increased to 94 per cent. by a further treatment with the reagent. This method has been used with considerable success to obtain secondary amines containing the higher alkyl groups, which were previously somewhat difficult to prepare. A device sometimes employed in order to obtain secondary amines free from tertiary is to replace one hydrogen atom of the amino group previous to alkylation with some group which is easily removed later. It is impossible in these circumstances to contaminate the product with tertiary base. Thus:—

$$R\,N\,H_2 \rightarrow RN\,H\,X \rightarrow RNAlk.\,X \rightarrow RN\,HAlk.$$

Thus the acetyl derivative or the toluene *p*-sulphonyl compound of an amine may be methylated by any one of the usual agents (methyl alcohol, chloride or sulphate) and the corresponding derivative of the methylated amine is formed, from which on hydrolysis the methylated amine is obtained free from tertiary base (E.P. 133,433; U.S.P. 1,497,251).

Similarly, the benzylidene compound of an amine, which is easily formed by warming together a primary amine and benzaldehyde, can be readily methylated by dimethyl sulphate in boiling benzene solution. The product on being steam distilled in the presence of acid gives benzaldehyde back again, and on basifying the residue and continuing the distillation, the mono-methylated amine is obtained free from the dimethyl derivative (E.P. 132,555). Another method of obtaining secondary amines which deserves mention, but which is not strictly alkylation, consists in reducing the condensation products of primary amines and aliphatic aldehydes. The reducing agents recommended are zinc dust and sulphur dioxide or zinc dust and caustic soda. Ethyl aniline is thus obtained from the condensation product of aniline and acetaldehyde, and methyl aniline from that of aniline and formaldehyde (D.R.P. 376,013; E.P. 102,834). The preparation of benzyl aniline is effected in a manner similar to that for alkyl anilines, namely, by treating aniline with benzyl chloride. The best conditions for this preparation

have been fully described recently by Clapham and Nolan (*Journ. Soc. Chem. Ind.*, 1925, T.220).

Separation of Amines

In the separation of mixtures of primary, secondary and tertiary amines, such as are obtained in alkylation processes, the first operation is to remove the primary amine, which is generally present in comparatively small quantity. This is best accomplished by adding to the mixture with vigorous stirring a quantity of strong sulphuric acid sufficient to form the acid sulphate of the primary amine. After some time the crystals formed are filtered off. The secondary amine may be separated from the tertiary by acetylating the former with acetic anhydride and removing the latter by distillation in steam. Another method depends on the fact that when phosgene is passed into a secondary amine a urea chloride is given, together with hydrochloric acid, the latter forming a hydrochloride with the tertiary amine present. The exact procedure depends on the proportions of secondary and tertiary amines in the original mixture, but the products may be obtained in a state of considerable purity (E.P. 128,372).

The alkylation of phenols is generally simpler than the corresponding operation with amines, though similar agents are used. The original method of obtaining anisol, for example, by treating phenol with methyl iodide and sodium in methyl alcohol solution is far too expensive for practical working, and in the present day the dialkyl sulphates, especially dimethyl sulphate, are very largely used. The phenol to be alkylated should be dissolved in an equivalent of caustic soda, dimethyl sulphate (the theoretical quantity, plus 10 per cent. excess) added, and the whole boiled under reflux for an hour or so, when the phenol ether generally separates. It is found in practice that the yield is generally improved by reducing the water present to a minimum. The alkyl esters of toluene *p*-sulphonic acid also act as excellent alkylating agents for phenols, the operation being best performed by boiling the phenol and the ester in equivalent proportions with an aqueous solution of sodium carbonate.

Difficulty is sometimes found in the alkylation of nitro phenols, the methods described above giving low yields. The best method is to alkylate with dialkyl sulphate in dry toluene or xylene solution in the presence of potassium carbonate. The nitro phenol is mixed with about ten times its weight of toluene, an equivalent quantity of potassium carbonate is added, and the whole boiled under reflux with good agitation while the dialkyl sulphate is slowly added over a period of a few hours. The operation is continued for 24 hours in all, when the alkylation is complete and the nitro phenol ether is separated from the toluene in some convenient manner.

Potassium ethyl sulphate acting on the dry potassium salt of the nitro phenol in the presence of a little glycerine has been recommended as an alkylating agent for nitro phenols (*Ber.*, 1923, 217). Incidentally, the alkylation of thio-phenols has been described, the agents used being toluene sulphonic esters and dialkyl sulphates, and good yields were obtained (*Journ. Amer. Chem. Soc.*, 1925, 1449).

Scientists and Coal Developments

At a meeting of the Sociological Society, held at Burlington House, London, on Tuesday, Professor Geddes, in a paper on changes in the coal industry as symptoms of social transition, said the difficulty in dealing with the coal question was the robust immunity to science which was characteristic of the British public.

Dr. Saleeby, whose paper on the required hygienic adjustments was read, stated that although coal was the stored-up sunlight of past ages, in order to use it seemingly they must burn the stuff and obstruct the sunlight of the present. It could not be doubted after the experience of Pittsburgh and other places that the automatic stoker served better for fuel economy and smoke abatement. No more need then remained for by-laws permitting black smoke emission for five or ten minutes every hour. Another method which had been tried was the pulverisation of coal, but these methods could not be regarded as final, fundamental, or even approximately adequate solutions of the problem. The way to clear the skies was to cease to burn coal and to distil it instead like intelligent beings.

Professor Cecil H. Desch, of Sheffield University, dealing with the required technological adjustments, advocated the grouping of collieries and close co-operation between all the groups. At a convenient geographical centre for a group of collieries there should be a coking plant capable of dealing with the output. The gas could be supplied to the district for both domestic and industrial purposes, and the excess could be used to generate electric power. The waste fuel should be powderised and used as fuel to raise steam in water tube boilers. The existence of an organised system of power lines was essential. It was probable that town supplies of gas would in the future come from coke ovens close to the pit mouth.

Mr. E. Kilburn Scott, in a paper on the adaptation of the coal gas industry, visualised a super power-station of the future supplying both industrial gas in bulk and illuminating gas, electricity in bulk, at high pressure for power and at low pressure for electrolysis, as well as all the by-products available from coal. The power station would be fired with gas obtained from low-temperature distillation plant and with pulverised semi-coke breeze.

Indian Chemical Notes

(From Our Indian Correspondent.)

Owing to a considerable number of inquiries from America, Martin and Co. are reopening their factory at Tamway in Burma for the scientific treatment of lac before making it fit for commercial purposes and export. Before the war, the Burma lac industry was in a flourishing condition, and Martin and Co. were the biggest dealers in lac at that time, and had a factory of their own, but owing to the war they had to close down their business. The factory is being reopened now, and will be under the personal supervision of Mr. J. A. Martin, who has had great experience of the industry and is a recognised expert.

The report on the mineral production of Burma shows that there was a slight decrease in the production of petroleum, but on the other hand lead and silver showed some increase. These latter are almost entirely derived from the Bawdwin mines, which produced during the year 50,559 tons of refined lead, 5,287,771 ounces of silver, 18,650 tons of zinc concentrates, 1,200 tons of antimonial lead, and 2,935 tons of copper matte. Deposits of oil shale in the Amherst district have recently attracted some attention. There was a considerable falling off in the production of rubies and sapphires. The total value of all the minerals and mineral oil exported from Burma to India and the foreign countries including the United Kingdom was Rs. 14 crores during the year, and of these about Rs. 5½ crores worth went to foreign countries.

Successful Pioneer Enterprise

The Indian Turpentine and Rosin Co.'s factory in the United Provinces, which was first started as a pioneer enterprise by the Government of the Province, and was, after success was proved, transferred to the management of the said company, showed good results of working during the year ending March 31, 1925. A dividend of ten per cent. has been declared by the company for the year, in spite of the fact that the market prices were generally lower during the period than usual. Considerable economies and improvements were effected during the year in the processes of manufacture, and products have been raised to a high standard of quality.

The Indian Chemical Society, founded about two years ago under the presidentship of the famous Indian scientist, Sir P. C. Ray, has now on its roll 3 life members and about 150 fellows. The Society is publishing a journal, towards the expenses of which the Allahabad, Punjab, and Calcutta Universities together give donations of about Rs. 2,000.

The Carrier Engineering Co., Ltd., of Bombay, have recently installed a humidifying and air conditioning apparatus at the Indian Central Cotton Committee's Technological Institute at Matunga, Bombay. It is equipped with full automatic control for maintaining both constant temperature and relative humidity, thereby permitting spinning tests to be carried out under the standardised atmospheric conditions which are so essential to consistent results.

The Government of the State of Mysore have ordered 402 miles of aluminium cable, steel reinforced, for the Kolar transmission line remodelling, through the Northern Aluminium Co., Bombay.

S. G. W.

Works Training Courses for Chemical Students

Successful Experiment at the B.D.C. Blackley Works

Attention has often been drawn of late to the need of providing facilities for senior chemical students at universities and similar centres to gain some practical insight into chemical works practice. The following account of a scheme instituted by the British Dyestuffs Corporation for a vacation training course for chemical students at their Blackley works is both interesting and encouraging as showing the growth of an admittedly sound idea.

PROMINENT among the reasons for the establishment of an efficient British dyestuffs industry is the fact that such an industry involves the maintenance of an adequate school of organic chemistry and provides both opportunities for chemical training and posts for trained chemists. The research work carried out by the British Dyestuffs Corporation has occasionally had important results outside the immediate commercial interests of the Corporation, and it is in keeping with this tradition of wider service that the Corporation should seek to cultivate the closest possible relations with recognised centres of scientific study. An example of their attitude is supplied by a recent circular, addressed by the managing director to University professors, from which the following passages are taken.

A Link Between Universities and Works

"The progress of the synthetic organic chemical industry in Britain depends so largely on the achievements of British chemists, both within and without the industry, and is a matter of such national importance, that I feel sure you will agree with me that the closest and most sympathetic co-operation is necessary between the universities and technical schools and the industry. It is only by a mass attack on chemical problems with all the chemical forces we possess that the British chemical industry can hold its own in competition with the foreigner, who has the additional advantage of operating in protected markets. We seek your active assistance in any or all of the following ways :—

"(*a*) That you bring to our knowledge from time to time, students of exceptional ability suitable for our research departments or works processes.

"(*b*) That you bring to our notice, in their early stages, researches in your laboratories which are likely to have an industrial application.

"(*c*) That you are willing from time to time to allow certain members of our research staff to discuss and, if desirable, to work on problems with you and your staff.

"(*d*) That you are willing to allow your students to engage in researches in conjunction with ourselves, or make investigations which, though not of immediate technical importance, will yet extend knowledge in these fields.

"We, on our part, shall be happy to give you such assistance with materials and in other ways as lies in our power, and to make special arrangements with you when such appear necessary.

"It may interest you to know that the question of allowing a limited number of students to gain works experience with us during the long vacation is receiving sympathetic consideration."

The "sympathetic consideration" referred to resulted in the announcement by the Corporation in July last to various Universities and University Colleges that they were prepared to grant facilities to a limited number of university students taking honours schools in chemistry, who had completed the second year of their course, to enable them to gain an insight into chemical works practice. The conditions were that the students must be of British birth, have no direct connection with the dyestuffs industry or industries competing with the Corporation, and must be recommended by their professor of chemistry. They would be expected to furnish the Corporation with a report on their experiences at the end of the period. Students would be grouped in pairs, each pair being allowed to spend a week or more in the analytical laboratory, research laboratory, one or more works laboratories and corresponding plant, works cost office, dyehouse, and engineering drawing office. They would be expected to observe all the rules and regulations in force in the factories and laboratories. The facilities were to be limited to the months of July and September.

The Blackley Scheme

In response to this, twelve students were selected from those who made application, drawn from the Universities of Sheffield, Durham, London, Bristol, Cardiff, and Edinburgh, the Imperial College of Science and Technology, and the Battersea Polytechnic. Of these eleven commenced the vacation course in the Blackley works of the Corporation on September 1, one student withdrawing for private reasons. Under the schedule drawn up each pair of students spent nearly a week in four of the selected six departments and the rest of the time in the remaining departments. The departments chosen were costing, engineering, technical research, azo colours, dyehouse, and central analytical laboratory.

In the costing department the students were initiated into the system for recording all the necessary transactions applicable to raw materials being received into the works and to the despatch of finished products and the method whereby the cost of a series of chemical operations or the cost of a particular product is arrived at. They were also afforded an insight into the methods used for controlling and checking expenditure in chemical operations. The work of this department made a particular appeal to the majority of the students, possibly because, although of such vital importance, it is so much neglected in the ordinary training of the chemical student destined eventually to enter the chemical industry.

In the engineering department the students were allowed to see the operations necessary when new plant is required to be laid down, and were initiated into the mysteries of flow sheets and blue prints. They were afforded opportunities of visiting the boiler station, ice plant, mechanical and electrical engineering shops, and of seeing electrical and acetylene welding as applied to the repair of chemical plant in operation.

In the technical research department the students worked as assistants to chemists engaged in research work, and themselves assisted in carrying out small scale technical operations in the experimental plant.

In the azo colours department they were set the problem of carrying through the manufacture of an azo colour in the laboratory, and afterwards following up the manufacture of the same colour in the works on the large scale, the work including the sampling and analysis of all the intermediates involved. The colour was subsequently dyed out on the fibre by the students in the dyehouse. In the latter department they were also shown the application of different classes of dyestuffs to various textile fibres and themselves carried out a series of dyeings on cotton, wool, acetate silk, etc.

In the central analytical laboratory the students were shown the methods of sampling, and the various analytical methods used for ensuring the purity of the multitudinous raw products, both inorganic and organic, required in the manufacture of synthetic dyestuffs, as well as for the control of effluents, coal, water, and other supplies, each student carrying out a number of typical analyses.

A Successful First Experiment

Thus at the end of the month each student had received a most valuable insight into the realities of chemical industry and had learned at first hand the importance of time and cost as factors of prime importance in the carrying out of chemical operations, factors which are too often neglected in the training of the chemical student.

The course was offered by the Corporation as part of its contribution to the training of industrial chemists. It is considered to have been sufficiently successful, from the point of view both of the students attending and of those members of the staff who directed it, to ensure its repetition, possibly on a larger scale, next summer. It was under the general control of Dr. Callan, who spared no effort to make it of real practical value.

British Rubber Experts at Delft

By C. H. Birkitt, B.Sc., A.I.C., A.I.R.I. (Sc.)

THE first official visit of the Institute of the Rubber Industry to the research laboratories of the Delft Institute took place from October 9 to October 11, at the kind invitation of Dr. A. van Rossem. The party, consisting of 24 members, assembled at Victoria Station, London, at 5.30 p.m., and proceeded to Gravesend for embarkation on the *Batavier V.* Rotterdam was reached the following morning at 8.15 a.m. without any serious casualties, in spite of a somewhat disturbed crossing. Thence the party proceeded by rail to the quaint historic town of Delft. On arrival at the Institute Dr. van Rossem welcomed the party, both individually and as a collective body representative of the British rubber industry. The Chairman of the London and District Section of the I.R.I., Mr. D. A. S. Porteous, suitably replied.

Rubber Research Laboratories

The rubber research laboratories, together with the Institute of Technical Botany, are housed in a modern building of commanding appearance. The whole party greatly appreciated Dr. van Rossem's generosity in exhibiting and explaining research work, the greater part of which is still unpublished. The well-equipped chemical laboratories were the envy of all. The work was illustrated with specimens arranged step by step showing the progress of the experiment. An improved method of alcoholic potash extraction was shown, and the depolymerising action of copper and iron on rubber was explained. Dr. van Rossem also gave a very detailed analysis of the acetone extract, and demonstrated the immediate effects of some of its constituents on vulcanisation.

The party next proceeded to the vulcanising room, where they were shown the suitability of an oil bath cure for vulcanising test pieces. A method of cutting rings for Schopper Tests from a moulded cylinder was much admired, as also were samples of calendered sheet illustrating Dr. de Visser's recent paper on calender grain. The mechanical testing room was fitted with the most modern type of plant. Cleverly devised attachments were shown, by means of which the Schopper machine automatically records fabric stripping and the bending and breaking of ebonite. In this department was shown an up-to-date type of plastometer, also a simple method of demonstrating the effect of heat on vulcanised rubber.

Later in the day they visited the Institute of Technical Botany. The director demonstrated with the K.D.P. plant the spraying of latex, and with the Sharples super-centrifuge the concentration of latex.

A Social Gathering

The party visited the old historic buildings of Delft during the afternoon, conducted by Mr. van der Meyden and Dr. van Rossem, who later were entertained to dinner at Cooman's Hotel, Rotterdam. In proposing the health of Dr. van Rossem and his staff, Mr. Porteous tendered the thanks of the whole party for the very warm welcome they had received, and the great pains taken in the preparations for the visit. Mr. Porritt seconded this motion, and in reply Dr. van Rossem stated that he was honoured to entertain the Institute of the Rubber Industry. Mr Porteous proposed the health of the Hon. Secretary, Dr. Drakeley, for the excellent manner in which he had arranged and supervised the visit.

On the following day the majority of the party visited The Hague in the morning, and Scheveningen in the afternoon. The members embarked at Rotterdam on October 10, reaching Gravesend at 9.45 a.m. the following morning.

New American Artificial Silk Co.

REPORTS state that a new artificial silk company, the Skenandoa Rayon Corporation, has recently been formed in the United States. The new concern is purchasing the works of the Skenandoa Cotton Company, at Utica, N.Y., and the mill is to be converted immediately. It is stated that the plant will have a capacity for the production of 700,000 lb. a year, and that output will eventually reach 3,000,000 lb. a year. The names of Mr. Henry Bronnert, of Manchester, and of Dr. Emile Bronnert, of Strassburg, appear on the board. The works, it is stated, will have the rights for the use of the "Lampose" process.

The Future of Alcohol Motor Fuels

The Problem of Taxation in America

IN his paper on the motor fuel situation and the possibilities of alcohol, delivered before the American Chemical Society on October 1 at the Chemists' Club, New York, Dr. Milton C. Whitaker, President of the U.S. Industrial Chemical Co., said that as a result of much statistical study and scientific research, the position of alcohol in the scheme of motor fuels had become very clear, and might be divided, for the purpose of discussion, into three headings: technical, economic, and sociological.

The present statistical position of alcohol in the scheme of motor fuels, so far as the United States was concerned, might be illustrated by the following approximate figures: Total production of petrol, 1924, 8,960,000,000 gallons; total production of alcohol, 1924, 71,000,000 gallons. Ratio of alcohol to petrol production, 1 to 125. It should be noted in considering this comparison that practically all of the alcohol produced was required to meet industrial needs, leaving little residue (147,000 gallons in 1924) for motor fuels.

The use of surplus alcohol in motor fuels was given intensive study, especially when war capacities indicated a large oversupply. Statistics of the maximum production of alcohol under present conditions as against the total consumption of motor fuels in France, England, and the United States, established the uniform conclusion that alcohol could not hope to replace petrol, but could only be used to supplement the petrol supply by being blended therewith, and that the amount of alcohol available, or in sight, was a very small fraction of the total amount of motor fuel used. In the meantime, extensive tests had been carried out in the actual use of such fuels in motor cars, motor boats, aeroplanes, block tests, etc. The merits and faults of alcohol-petrol blends were investigated, and the superiority of such fuels was now safely established by actual experience.

Industrial Alcohol and Prohibition

The future of alcohol motor fuels is largely an economic problem, involving the relations between the cost of alcohol and petrol. The habit of taxing alcoholic beverages exists in all civilised countries, and is so firmly entrenched that it even survives changes in the form of government. In the process of national development, when alcohol is produced for industrial purposes, the programme of beverage taxation is invariably extended to alcohol itself, even though the product, as such, is not fit for use as a beverage. In the United States the struggle between industrial needs and the beverage-taking habit had received a measure of relief in the passage of the tax-free denatured alcohol Act less than twenty years ago. The beginning of the industries for making and using alcohol for industrial purposes might be said to have begun there at that time. While the American Government had been liberal, as governments go, in the extension of the tax exemption to industrial alcohol, it must be said that the right of tax relief had been granted grudgingly, and the manufacture and use of industrial alcohol has been hampered by the many expensive restrictions. These restrictions had been recently increased by the advent of the great social measure known as Prohibition. A substantial proportion of the cost of Prohibition was already being loaded on to the alcohol producing and using industries, and this at the very time when both the industries using alcohol and the economics of the fuel problem demand that that commodity be cheaper. The technical problems had been solved by the chemical and automotive engineers, and the problem was now solely one of suitable economic conditions and of public will.

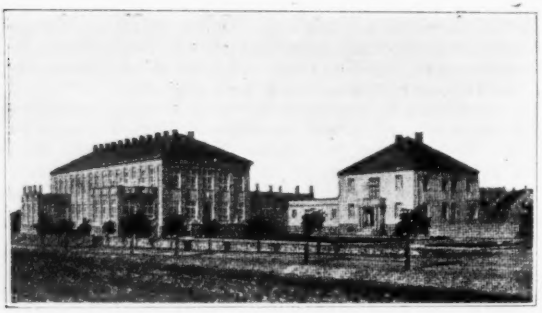
U.S. Chemical Exports Increase

OFFICIAL figures for August show a 26 per cent. increase in U.S. chemical exports over the previous year, the value being $14,410,000. Dyes showed an increase in all classes except certain finished coal tar products. Exports of industrial chemicals, at $2,180,800, were higher than imports, and an important point was the importation of 48,980 lb. of iodine—the first importation for over a year. Exports of fertilisers and allied products showed a 30 per cent. increase on last year, and imports of these chemicals were up by 65 per cent. on last year.

American Views on Fuel Research in Europe

Tribute to British Investigations

In a paper presented to the American Chemical Society recently, Dr. A. C. Fieldner gave his impressions of a visit to Europe, which he undertook on behalf of the U.S. Bureau of Mines, to investigate the methods of fuel research in Britain, France, Belgium, and Germany. His paper is published in the October issue of *Industrial and Engineering Chemistry*, from which we reproduce some of his impressions together with the accompanying photographs. European Governments, Dr. Fieldner states, as well as industrial associations in the various countries, are showing a greatly increased interest in fuel research since the war. They realise the vital



Institute for Coal Research, Mulheim-Ruhr, Germany

importance of cheap and efficient use of fuel in the growing economic struggle between nations.

Low Temperature Carbonisation

The British Government appropriated a considerable sum of money before the end of the war to establish a National Fuel Research Station at Greenwich, which is to-day the largest Government-supported experimental station exclusively for fuel research in the world. This station operates under the general direction of the Fuel Research Board of the Department of Scientific and Industrial Research, Dr. C. H. Lander being director of the station and Sir Richard Threlfall chairman of the board. The production of smokeless domestic fuel and substitutes for petroleum products from low-temperature tar is the major problem now occupying the staff. Whether or not the station develops a commercially feasible process for low-temperature carbonisation of coal, it will perform an invaluable service to Great Britain in securing reliable data on the yields and quality of the products that can be obtained by such processes from British coals.

The Institution of Gas Engineers of Great Britain maintains at the University of Leeds, under the direction of Professor Cobb, certain fellowships in gas engineering research. Fundamental problems such as the influence of steaming and method of carbonisation and gasification on the liberation of nitrogen and of sulphur, efficiency of gas appliances, heat of reaction in the carbonisation of coal, etc., are the subjects of these fellowships. A new experimental carbonisation plant consisting of separate batteries, one containing horizontal and the other vertical retorts, has recently been completed.

British Commercial Scale Experiments

Great Britain has undoubtedly led the work in commercial low-temperature carbonisation experimentation. The desire to produce a smokeless semicoke for open-grate fires and a home source of liquid fuel has been the urge behind this work. Almost every conceivable method of carbonising coal has been tried, and one finds the same vigorous opinions on the economic possibilities of low-temperature carbonisation that prevail in America.

The two processes that are seemingly the nearest to technically successful operation in England are the Parker retort process at Barnsley, and the Maclaurin process at Glasgow. The Barnsley plant consists of two batteries of thirty-two cast-iron vertical retorts each, of a total capacity of 100 tons per 24 hours. The coke is fairly dense, contains 10 per cent. volatile matter, and is excellent smokeless fuel for open grates. Complete results of an official test by the Fuel Research Station have recently been published. Whether the process will prove an economic success can only be shown after several years' operation furnishes data on the maintenance costs of the iron retorts, and after commercial returns on the products are definitely established. The Maclaurin retort is an internally heated gas producer type of carboniser. The gas is necessarily of low heating value and the coke is friable and porous; therefore, less desirable for domestic fuel than the Coalite from the Parker process. However, the retort is much cheaper and should have less maintenance cost.

The Position in France

From a national point of view France is intensely interested in securing a home source of liquid fuel. The only possible internal source is coal. The Government, recognising this need, has detailed E. Audibert, director of the French Coal Dust and Explosives Testing Station at Montlucon, also to direct the research of the newly organised National Association of Research for the Treatment of Fuels. This organisation includes commercial fuel interests and the Government. A new laboratory was being equipped last autumn for experimental work on (1) the Bergius process of hydrogenation and liquefaction of coal, and (2) the production of liquid fuels from some combination of gases—as, for example, carbon monoxide and hydrogen. Audibert proposes to make a comprehensive experimental study of the reactions of these gases at various temperatures, pressures, concentrations, and in the presence of all the different possible catalytic materials that he can think of. Considerations of cost and economic feasibility are not to enter into his research programme. It is now evident that this programme was inspired by knowledge of the successful synthesis of methanol in Germany. Audibert has recently published the first report of his own work on methanol synthesis (*Chimie et Industrie*, Vol. XIII, p. 186).

Low-temperature coking, according to Audibert, does not interest France, because stoves and furnaces, rather than open grates, are used for house heating. There is therefore

Fuel Technologists from World Power Conference at Fuel Research Station

Left to right—J. G. King, R. Lessing, B. F. Haanel, C. H. Lander, F. S. Sinnatt, Franz Fischer, Professor Purcell

no need for a smokeless semicoke. Furthermore, low-temperature tars do not yield much volatile motor fuel, which will eventually be needed to replace petrol.

German Brown Coal

In Germany one is at once impressed by the close co-operation of the Government, the universities and the industries. Although the present Government does not directly support fuel research, it does actively promote and co-ordinate the work of a number of research institutes and association laboratories supported by the industries through a Fuel Research and Utilisation Committee of the Reichskohlenrat. The two Kaiser Wilhelm Institutes for Coal Research—the

one at Mülheim-Ruhr and the other at Breslau—and the Institute for Brown Coal Research at Freiberg are supported by industrial groups in the particular district in which they are located. The directing staffs are in close touch with both the universities and the industries. A large portion of the working staffs of these institutes consists of students from the universities taking their post-graduate research work for Ph.D. degree. Before the war these institutes, as well as the university laboratories, were engaged almost exclusively on fundamental scientific research. But since that time, owing to the loss of their supporting endowments, they have been obliged to turn their principal efforts to meeting the immediate problems of the industry in the substitution of brown coal and inferior grades of bituminous coal for the high-grade Ruhr coals which had to be exported on reparations account.

Liquid Fuel Research

The leading coal research institute in Germany is the Kaiser Wilhelm Institute at Mülheim-Ruhr, in the heart of the Westphalian coal fields, which is directed by Dr. Franz Fischer, who is seen with other fuel experts in the accompanying photograph. The problems come under three main headings: (1) the constitution and origin of coal; (2) the coking constituents of coal; and (3) the production of oil from coal. The outbreak of the war within a few months after the completion of the institute naturally diverted the main energy of the first five years of its existence to the problem of making petroleum substitutes from coal. The small laboratory rotary retort was the forerunner of the large Thyssen and Fellner-Zeigler low-temperature retorts, which were put into commercial operation during the period of petroleum shortage. Research on the composition and utilisation of low-temperature tar from various bituminous and brown coals is one of the important current problems.

The most interesting problems, however, were those involving reactions at high pressures. Fischer has developed technic and special apparatus of great variety for extracting coal with solvents at temperatures considerably above the boiling point of the solvent, for oxidising coal and coal constituents in the presence of various reagents under pressure, for studying the action of carbon monoxide and of hydrogen at high pressures, and for the production of combustible liquids from the interaction of carbon monoxide and hydrogen, in the presence of catalysts at high pressures and temperatures. By these methods of attack he has obtained data supporting the lignin theory of the origin of coal, and has produced Synthol, a gasolene fuel substitute, from carbon monoxide and hydrogen. A problem of practical interest was the isolation of the coking and swelling constituents of coal by extraction of the coal with benzene at 250° C. and treatment of the extract with petroleum ether. Some experimental work on the Bergius process for hydrogenating coal was also in progress.

Gas Research and Teaching Institute

The German Gas Association maintains a research institute at Karlsruhe, directed by Dr. Karl Bunte. The institute is supported by the German gas industry, the amount of money contributed being based on the tonnage of coke produced by each supporting company. Besides conducting more or less fundamental research work of interest to the industry as a whole, the institute does consulting engineering work for the individual companies, for which it is paid by these companies on the basis of actual cost plus a small charge for overhead expenses. Owing to the change in coal supplies as a result of the war, this consulting work has occupied a large part of the energies of the staff. Yet, in spite of these unfavourable conditions for research, Dr. Bunte has been able to carry on a fair amount of fundamental work for publication with the aid of students at the Hochschule taking their thesis work in his department and at the institute, most of these problems having to do with coke. Dr. Bunte stated that the big problem before the gas industry was to make a more desirable domestic fuel. Evidently, gas coke lacks popularity in Germany as well as in other countries.

The Fuel Research Station in England reminds one of the Fuel Testing Plant established by the United States Government in St. Louis at the Louisiana Purchase Exposition in 1903. There is a similarity of magnitude and of purpose in so far as surveys of national fuel resources are concerned. However, the St. Louis investigations and the subsequent work of the Bureau of Mines were concerned mostly with the combustion of coal, whereas the British plant is concentrating on the carbonisation of coal. American power-plant operators have been quick to take advantage of the results of American Government research organisations. The tremendous progress made in modern American power plants has placed them far abead of most European plants. To an outside observer it appears that the gas and coke-oven industry of England does not keep so closely in touch with the Fuel Research Station as is done in America.

In fundamental scientific research on the constitution of coal and on flame propagation British investigators lead the world, but there is a well-defined gap between them and the industries—a gap that is not observed in Germany, or in America. The close relations between German Government and university investigators and the industry before the war is well known. This relationship is even stronger to-day, since institutional endowments have disappeared, and these institutions are obliged to subsist on direct contributions from industry. However, regardless of how fuel research may be supported in European countries, they all recognise the basic nature of the fuel problem in relation to the industrial life of the nation and, bearing in mind the general lack of funds, they are carrying on much more research than our own far wealthier country. The successful development of a synthetic methanol industry in Germany is a sufficient proof of the value of such research.

Sir John Harrison and Fire Damp

To the Editor of THE CHEMICAL AGE.

SIR,—I have read with some interest your editorial note in your issue of July 25, as to the occurrence of fire-damp in certain American metal mines. I have not seen any of the American reports alluded to in your note. If the Peter's mine had been worked in a carbonaceous rock it would not have been necessary for me to undertake the long investigation I did, but the auriferous vein in the Peter's mine was a compact quartz vein passing at depth into a slightly auriferous aplite mass, the quartz vein traversing a very compact epidote-chlorite-felspar rock, a part of the pre-Cambrian Archean basal complex of the Guianas.

The object of the publication of our notice was to warn persons who might be engaged in reopening or dewatering abandoned gold mines in the Guianas, of which there are several, of a possible danger. The Peter's mine when in active work had been lit by electric lamps, but the installation had been removed at the closing down of the mine. It was unfortunately not possible to secure air circulation in the rise similar to the ample ones of the various levels. Yours, etc.,

J. B. HARRISON.

Science and Agriculture Department,
Georgetown, Demerara,
British Guiana.

Calcium Cyanamide Organisation

THE European producers of calcium cyanamide have formed an organisation to extend the use of this fertiliser in the principal agricultural countries of the world. The headquarters of the organisation are in London and other offices are being opened in Belgium, Holland, India, Egypt, and other countries. Calcium cyanamide, which is produced by an electrical process from the nitrogen of the air, is already widely used as a fertiliser, being especially valuable for sugar beet and other root crops. The results of tests carried out in England have indicated that it is well suited to British soil conditions. Arrangements have already been made for further experiments to be carried out. The supplies of this fertiliser are practically unlimited, as they are only dependent upon the electrical energy available in the producing counties. Already 800,000 tons come on to the world's markets each year. So far as this country is concerned, it is anticipated that supplies will be available during the coming autumn and spring.

Coloured Fabrics in the Laundry

Behaviour of Modern Dyes

In the course of a lecture on "Coloured fabrics at the Laundry," given on Wednesday, October 14, at the rooms of the London Section of the Textile Institute, Mr. C. F. Townsend said that when wool and silk were dyed with the old mordant dyes the colours were very fast and did not give any trouble in the laundry, but a great many silks and wools were now dyed in the acid bath, and all such fabrics were very sensitive to the action of soap and soda, and there was a certain amount of bleeding. He had recently come across many delicate tinted silks which were quite unsuitable for laundry work, and when washed carefully in almost cold soap the colour practically disappeared. In some cases of French dyed blue foulards the colour was so sensitive that even the combined elements in the soap were sufficient to cause a change of, say, blue to pink. In many cases the colour could be brought back by dipping the fabric in a weak acetic acid solution.

There were four principal ways of dyeing cotton, linen, and viscose artificial silk, but "Celanese" had to be dyed in a different manner. There were first the mordant colours, which were extremely fast, then came the developed dyes such as Turkey red, which again were very fast and not generally affected by light or washing. Next came the large class of dark cotton colours, which were dyed in a neutral or alkaline bath; these colours varied greatly in their fastness to light and washing. Some were quite good and some ought never to be used at all, for they bled in cold water even without the addition of soap. The last of the series were the vat colours, and the laundries handled many articles in which these dyes were used. In a general way they were quite fast to light and to washing, but most of them would not withstand bleaching.

The earlier vat colours were known as sulphur dyes because they were dyed with the assistance of sodium sulphate; they were satisfactory up to a point, but would not withstand bleaching. The more recent colours of the vat series were so fast to bleaching that they were dyed in the grey and bleached afterwards, and from the laundry point of view these colours had caused many disasters. When fixed by exposure to the air they were fast and insoluble; in the dye bath they were made soluble by the addition of alkali and a reducing agent. The yarn or piece was steeped in the dye, well exposed to the air to oxidise, and the colours became fixed. The trouble was that if any reducing agent was present in the washing, the colour would mark off on the white ground of its own fabric or on any other fabric in the load and probably many other articles would be spoilt. Nothing could be done when once the disaster had occurred, as the dye which had marked off became oxidised again on exposure to the air and became entirely fixed. The explanation appeared to be that some over-bleached fabrics were contained in the load in the machine. An over-bleached linen or cotton fabric contained a substance known as oxy-cellulose, a very powerful reducing agent in the dye vat itself. So far there seemed to be no safeguard and no remedy.

Indigo and Rubbing

Then, with regard to the question of rubbing some dyes rubbed very badly, *i.e.*, when the dyed fabric rubbed against another one, the dye was rubbed off. Indigo on cotton was particularly bad in this respect, and chemists in Manchester who had tried it were astonished to find the extent to which indigo rubbed. One of the causes of the rubbing was what was known as "top dye." Instead of the colour being properly dyed, it laid on the surface and, although it looked all right when dried, most of it came away when the fabric was washed.

Chemical Trade Wages

At a meeting of the Chemical Joint Industrial Council, at Northwich on Friday, October 16, Mr. Lloyd Roberts, as representative of the Chemical Employers Federation, deferred until January the appeal for a wage reduction on the trade union representatives undertaking to urge employees to co-operate with employers to secure elimination of waste and secure greater efficiency. Notices are to be posted in all chemical works in the kingdom, and Mr. Lloyd Roberts expressed the hope that the three months' experiment would obviate a wage reduction. The trade unions promised full assistance.

Sulphur from Shale Oil

Consulting Chemist obtains his Fee

At the Southwark County Court, on Tuesday, before Judge Lush, Dr. S. P. Schotz, a well-known consulting and research chemist and chemical engineer, of 48, Newcomen Street, London, sued Mr. G. A. Ochs, consulting chemist, of 351, Brixton Road, London, to recover £16, the balance of an account for services rendered. The defendant counter-claimed for £34, as to £20 money lent, and £14, the value of a microscope.

Mr. Paul, for the plaintiff, said that the defendant knew a Mr. Hale, who had an invention for extracting sulphur from shale oil, leaving the remainder commercially valuable. The defendant asked the plaintiff if he would give his opinion on this invention, and agreed to pay him £50 if he could prove that the process was valueless, as the plaintiff believed it to be. On March 15 the plaintiff was informed that the defendant had entered into preliminary negotiations with regard to taking up a share in this concern with Mr. Hale, but that it was not legally binding if the invention proved worthless. A contract was entered into whereby the plaintiff was to get £50 if he proved the process to be worthless; the plaintiff was also to be supplied with any apparatus required that he had not got, free of charge. The defendant later found that he was bound to purchase the shares in any case. When the plaintiff asked for his money, he was given £20, and agreed to accept a microscope, valued at £14. This left £16 owing to make up the £50.

The Plaintiff's Evidence

The plaintiff, in giving evidence, said that when informed that a Mr. Hale had an invention whereby sulphur could be extracted from shale oil, he told the defendant that many fortunes had been lost in endeavouring to do that, and mentioned a well-known company. The defendant said that if the patents were valueless he would not have to pay anything. The plaintiff had to prove that the patents were absolutely valueless, and for so doing he would receive £50, because he would save the defendant something like £1,000. If the defendant had known that he would have to complete the purchase, he would not have entered into the agreement. The plaintiff started with his experiments, having first obtained a number of samples of shale oil. He told the defendant that sulphur had never been taken out of shale oil before, and he had not much hope of doing so according to the specification he was given. The defendant was very angry when he asked for his money, gave him £20, and said he would give him another £20 when he handed in a report of his experiments. As he had had no further money he refused to hand over the report, although he had made it out.

In cross-examination, Dr. Schotz said that he had never had an agreement like this one before. The process to be employed according to the specification was that sulphur containing oil should be treated with bleaching powder and iron, or iron filings. After other treatment, including distilling, the oil was supposed to be free from sulphur, but it was not so, as the oil contained nearly as much as it did before it was treated. On another specification he was to work on, he was not supplied with the apparatus, so he could not carry out any experiments on it. The experiments with regard to the shale oil were carried out in a yard, owing to the objectionable smell. Experiments had been successfully carried out to extract sulphur, but not from shale oil. Even those experiments could not be called commercially successful, for they brought no financial benefit, although many different kinds of oils had been tested.

Miss Rosen, B.Sc., formerly assistant to the plaintiff, and Miss Nicholas, the plaintiff's typist, also gave evidence.

The Defendant's Case

For the defence, Mr. G. A. Ochs stated in evidence that he had paid Mr. Hale £500 to have an interest in these patents, and was in a position to complete the deal. He agreed that if the venture succeeded he would be a very rich man. He knew the plaintiff before the agreement was entered into. The plaintiff never told him that the patents were valueless, nor did the defendant say that he knew, but he wanted it confirmed. He was informed later by his solicitors that he would have to complete the deal with Mr. Hale, as he had gone too far to draw back. When he saw the plaintiff, he was shown figures of the test that had been carried out.

In cross-examination the defendant was asked why he had tried to get out of his contract with Mr. Hale, when, if it proved successful, he would be worth millions of pounds? He said that he did not know, but Mr. Hale had never really given him time to get out of the contract.

Judge Lush: It seems to me perfectly clear that this is absolutely valueless.

Mr. Molar (for the defendant): If your Honour takes that view as to the contract, I submit it is a question of non-delivery, as the plaintiff never supplied the other report on his experiments.

Judge Lush: He could not; you would not supply him with the apparatus. I think the plaintiff is entitled to succeed, and there will be judgment for the plaintiff on the claim for £16, and the defendant's counterclaim for £34 will be dismissed with costs.

The Late Professor Lefroy

A Memorial Laboratory Scheme

At the inquest at Westminster on Friday on Professor H. Maxwell Lefroy who, as reported in The Chemical Age last week, died from gas poisoning at the Imperial College of Science and Technology, a verdict of "Death through misadventure" was returned. Medical evidence was offered to the effect that the Professor died from cardiac failure brought on by œdema and congestion of the lungs. The coma was due to the sudden inhalation of another poison on top of chronic toxæmia due to the inhalation of poisonous gases. An assistant could give no indication of the gas used.

Professor A. R. Low, speaking at the Institute of Patentees on Thursday, October 15, said that Professor Lefroy had invented a pump spray which would shortly be marketed quite cheaply, and which would kill house flies without affecting human beings or damaging articles with which the spray came into contact.

A memorial to Professor Lefroy is to take the form of a special fund, the proceeds of which will be devoted exclusively to the continuous application of biology to the problems of everyday life and the foundation of a Lefroy Laboratory of Applied Biology, where it can be studied and put into practice. Donations should be sent to Mr. A. Moore Hogarth, College of Pestology, 52, Bedford Square, London, W.C.1.

At the request of the late Professor, the officials of the college are to withdraw the gold medal for 1926, and to offer it for the best monograph of not exceeding 1,000 words on the bed bug menace and its solution. The medal will, therefore, be open to international competition in the terms of Professor Lefroy's wishes.

Disinfectants and General Products, Ltd., of Hatton Garden, London, states that under agreement with the late Professor Lefroy it holds a number of his recent and most important formulæ.

The Government and Export Trade

Address by Sir Philip Cunliffe Lister

In the course of an address which he delivered from the London station of the British Broadcasting Co. on Tuesday evening, Sir Philip Cunliffe-Lister, President of the Board of Trade, said that a revival of trade must be looked for as the only certain cure for unemployment. The Imperial Economic Committee had been studying the methods by which the sale of Empire products in this country could be stimulated and encouraged, and this was a development of the first importance. It was a mutual trade of equal benefit to producers in the Empire, and to the manufacturers here, although the full development of the resources of the Empire would be the work of years. Every opportunity was needed for increasing our trade and particularly our export trade, and an important opportunity was afforded by the revival of the British Industries Fair.

The British Industries Fair

The British Industries Fair was not an exhibition in the same sense as the British Empire Exhibition, which had for its main purpose the education and recreation of the public. The sole object of the Fair was to bring producers and wholesale buyers together, and to the buyer it affords the opportunity of seeing in one place and at one time the latest products of British industry and so of saving a great deal of time, trouble, and expense in travelling through the country. The British Industries Fair was instituted in 1915, and had been held annually since then except that this year the London section was discontinued owing to the continuance of the British Empire Exhibition. The Fair had grown steadily and proved a valuable part of the mechanism of sale and distribution. The Government had decided, therefore, to hold the Fair in February next, and with the support of the manufacturers to leave no stone unturned to make it a success. The Government was concentrating its efforts and spending a considerable sum of money on bringing the Fair prominently to the notice of buyers in every country, and an invitation to come to it or to send an agent in England, was being sent in the appropriate language direct to about 50,000 business firms all over the world.

"In conclusion," said Sir Philip, "let us pull together, and we shall emerge from the slough of despond to the high road to prosperity. By a united and sustained effort we shall overcome them and come through the stronger for the trials we have undergone."

High Energy Chemistry

Dyers and Colourists at Manchester

The first meeting for the Session 1925-6 of the Manchester Section of Dyers and Colourists was held on Friday, October 16, when Mr. J. Huebner, F.I.C., presided over a large attendance.

The Chairman announced that Dr. E. Knecht, who had undergone a very serious operation in August, was now well on the way to recovery, and hoped to return to the College of Technology very shortly. It was resolved that a letter of sympathy be sent to Dr. Knecht from the Section. The Chairman also made a strong appeal to the members to increase the membership of the Society.

A paper on "High Energy Chemistry" was read by Professor E. C. C. Baly, F.R.S., F.I.C. The author explained that the chemistry of high energy was a function of the living organism, and after death the high energy content must sooner or later be lost with the simultaneous disappearance of the vitamin properties and much of the food value. The question inevitably suggested itself as to how rapidly this change took place during cold storage, for it would seem impossible that the activated state specifically maintained in the living organism could survive for more than a limited time after death. It would seem that there must be two deaths in the living organism, of which the second was the loss of high energy content which was so important a factor in its food value. Man must assimilate his food in the period which intervened between these two deaths. If this second death took place during cold storage, a marked deterioration in food value would ensue, a possibility which was well worthy of investigation. A word of warning must be given regarding such investigation, for the second death was only a loss of energy, and was not necessarily accompanied by any obvious chemical change. Evidence that no change in chemical composition had supervened would be valueless as an answer to the question how long after the killing of an animal or plant did the conditions of high energy persist which characterised it when living and endowed it with especial value as a food? An opportunity was, therefore, presented for investigation which must lead to results of great value. The methods of the work must not be those of ordinary chemistry or of biochemistry, for it was a problem of energy and energy alone.

The old chemistry of the laboratory, the chemistry of low energy, was quite distinct and apart from the chemistry of life or the wondrous chemistry of high energy. When death supervened, the essential principle of the living organism, the high energy content, was slowly radiated away, and they found, by methods of analysis, nought but the dull compounds themselves with all the magic of their vital functions lost. The chemistry of the test tube, flask, and beaker, the organic chemistry of to-day, could teach us now no more of life by reason of the low energy restrictions set upon it. With the development of the new chemistry perhaps we might aspire to that greatest science of all, the chemistry of man in health and in disease.

From Week to Week

PRINCE GINORI CONTI gave a paper on Italian "Boric Acid" before the Ceramic Society, at Stoke-on-Trent, on Monday.

THE FIRST BEET SUGAR FACTORY is in course of erection in Latvia. The plant will operate next spring and is expected to handle 500 tons of sugar beet daily.

A SECOND CHEMICAL INDUSTRIAL EXHIBITION, to be held in Tokyo next spring, is under consideration by the Chemical Industries Association of Japan.

OVER 10 PER CENT. of the male insured workers in the chemicals etc., industry were unemployed in September—the returns for the month being 8,131 males and 1,156 females.

BRUNNER, MOND AND CO., LTD., have made further donations towards research at Manchester University—a sum of £150 each to the departments of Physics and Metallurgy.

ARGUMENTS in the suit against the Chemical Foundation to test the validity of the sale of German dye and chemical patents by the Alien Property Custodian will be heard by the U.S. Supreme Court on November 16.

OVER 200,000 GALLONS OF METHANOL were shipped from the Frankfort district to America during the three months ending July 30, according to the statistics issued by the American Consul-General in Berlin.

SIR FRANK HEATH, secretary of the Department of Scientific and Industrial Research, is in Australia, where he is investigating fuel development, and is to examine the Morwell brown coal deposits. Later he will visit New Zealand.

THE BRITISH EMPIRE EXHIBITION, WEMBLEY, is to be placed in the charge of liquidators as early as possible after the close on October 31, for the purpose of realising the assets and discharging the liabilities of the Exhibition.

BRITISH VISADA, LTD., a new artificial silk company which has acquired the Python Mills at Littleborough and hopes to start production next spring. Details will be found in our Company News. The company is stated to have secured the services of an eminent chemist and the plant is to cost £160,500.

AT THE OPENING of the first beet sugar factory running under the Government subsidy, Mr. E. F. L. Wood, Minister of Agriculture, speaking at Ely on Thursday, October 15, said that eight new factories were contemplated, and six would be ready shortly. The annual output at the Ely factory would be 15,000 tons.

THE FIRST ANNUAL NORMAN LOCKYER LECTURE established by the British Science Guild, will be given in the hall of the Goldsmiths' Company on November 16 by Sir Oliver Lodge on "The Link Between Mind and Matter." Lord Askwith, president, will take the chair. Tickets from the secretary, 6, John Street, Adelphi, W.C.2.

AT THE ANNUAL MEETING of the Chemical Industry Club on Monday, Dr. W. R. Ormandy was elected chairman in succession to Mr. H. E. Coley. The other officers were re-elected, namely, Mr. Chaston Chapman, president; Dr. E. H. Tripp, honorary secretary; Mr. T. Miller Jones, honorary treasurer; Mr. J. Arthur Williams, secretary.

THE GAS INDUSTRY DOES NOT FEAR the proposed subsidies for the electrical industry or for low-temperature carbonisation, according to Mr. J. H. Ellis, in his presidential address before the British Commercial Gas Association at Plymouth on Tuesday. A low-temperature product under the name of "Coalite" had been unsuccessful at Plymouth, and nowhere could he find that it had been made to pay. Mr. John Cowan, Newcastle, was elected president for next year, and the conference would be held at Newcastle.

DAMAGES IN THE SUM OF £5,000 and costs were awarded Mr. Charles Alfred Bolton, of Baker Street, London, W., metallurgical chemist, against Peachey Leather Products, Ltd., St. Helen's Place, London, on Friday, in the King's Bench Division. Bolton brought the action for wrongful dismissal from the position of managing director of the company, at a salary of £1,200 a year on a five years' contract. The company was to have exploited the manufacture of artificial leather by a process of slow and cold vulcanisation of rubber, but the process was not a success. Directors of the company included Lord Gainford and Lord Daryngton.

THE BORVISK ARTIFICIAL COMPANIES, which have various continental enterprises, have now registered as the Borvisk Syndicate, Ltd., at 53, Brown Street, Manchester, to manufacture artificial silk by the Borvisk processes. The directors are Messrs. B. Borzykowski, Paris; J. H. S. Lawson, Heaton Mersey; and R. P. Lawson, jun., Marple. The last two are members of the firm of R. P. Lawson and Sons, Ltd., of Rodney Street Dye Works, Manchester. The German Borvisk Company, at Herzberg a few months ago increased its capital to 5,000,000 marks and decided to pay off 5,000,000 marks debentures. Factory extensions at Herzberg have almost been completed. The Borvisk factories in Switzerland and France are stated to have doubled their production.

A SUGAR BEET FACTORY is to be built at Selby by the United Sugar Co., Ltd., the directors of which company include Sir Ernest Tate and Sir Leonard Lyle.

THE CHAIRMAN of Novocrete and Cement Products, Ltd., Mr. R. Bruce Hay, has left for America in connection with the American developments of the company.

BRUNNER, MOND AND CO., LTD., has 32,000 shareholders, 1,300 of whom have an average holding of £340, according to Sir Alfred Mond, speaking at Swansea on Tuesday.

PUBLIC LECTURES ON "CHEMICAL WARFARE" will be given on Thursdays at 5.30 p.m. at the Imperial College of Science, South Kensington, as part of a series of lectures on "War Studies" which begin on November 12.

A FURTHER SUGAR BEET FACTORY is to be erected in East Suffolk, and it will have a working capacity of 100,000 tons. It will be completed in October, 1926, on a site between the existing factories at Cantley and Ipswich.

THERE HAS BEEN NO INCREASE in the cost of artificial silk since the tax, according to Mr. Churchill, speaking at Woodford on Wednesday, and the nation's silk trade is entering upon a period of considerable prosperity.

OVER 60,000 PERSONS attended the American Exposition of Chemical Industries (reported in THE CHEMICAL AGE last week), and more than 12,000 were registered as representatives connected with the chemical industry.

JAMES GORDON AND CO., LTD., Windsor House, Kingsway, London, W.C.2, wish it to be known that all correspondence regarding the Duplex Mono Recorder should be addressed to the firm direct at the above address.

THAT LEAD POISONING IS INCREASING in the pottery industry and that low solubility glazes are not innocuous were contentions of representative witnesses before the Committee on Industry and Trade in London on Wednesday.

A GENERAL LOCK-OUT has been ordered in the Bavarian chemical industry by the Manufacturers' Union. This order took effect as from October 21, following unsuccessful negotiations, and before that date some 5,000 workmen were on strike.

THE FEDERATION OF BRITISH INDUSTRIES has appealed to the Bank of England to abandon completely, or at least to modify, the present embargo on foreign loans in this country where such loans might be of considerable assistance to British trade.

FIFTY YEARS' SERVICE AWARDS have now been made to fifteen more employees of Pullars, dyers, of Perth. At present there are no fewer than ninety-four employees—seventy-four men and twenty women—who have each served the company for over fifty years.

THE EDWARD MEDAL has been awarded to Robert Pearson, labourer, employed at H. Marsland, Ltd., bleachers, Stockport, for rescuing one of two lads who were trapped in a vat which was filled with scalding liquid in error. Both lads died and Pearson was seriously injured.

"FACTOCRETE," the concrete material invented by Commander Burney, M.P., and already referred to in THE CHEMICAL AGE, is to be used in the erection of four test houses built on the "Prefacto" system by the London County Council. It is claimed that this material lends itself to rapid block making, and can be moulded or sawn into any desired form, being an aggregate of shredded wood, impregnated with certain chemicals and mixed with cement. The London and Eastern Prefacto Co., Ltd., is handling the material.

METALLURGICAL TRAINING was the subject of Dr. L. Aitchison's presidential address to members of the Birmingham Metallurgical Society. The breach between science and industry, he said, would probably not be bridged until such time as the industrial metallurgist was allowed to become a scientist. The more science that could be introduced into metallurgy, the better, and the Society could help the union of science and industry by acting as a clearing house for dispersing records of advances in the theory and in the practice of metallurgy.

THE VICKERS SPEARING BOILER CO., of which Vickers, Ltd., are the sole proprietors, will in future be known as the Vickers Boiler Co., Ltd. The management of the company will be as follows: Mr. Douglas Vickers, chairman (chairman of Vickers, Ltd.), Sir Vincent Caillard and Commander C. W. Craven, director (directors of Vickers, Ltd.); Mr. W. F. Sadler and Mr. J. Kerr Bock, joint managing directors; Mr. G. T. Williamson, general manager; Mr. Harold B. Clark, secretary. The address of the new company will be as before, 20, Kingsway, London W.C.2.

THE PROHIBITION OF CELLULOID for the manufacture of toys is advocated in a resolution passed by the Institute of Hygiene last week and forwarded to the Home Office, the Ministry of Health, and the Board of Trade. In the course of tests, cheap toys were found to ignite on the touch of a match, and to flare up to 15 in. in height for periods up to thirty seconds, and to smoulder for a further period. Imitation ivory toilet articles made of celluloid were also condemned, and it was stated that the articles were more highly inflammable than any hitherto known on the British market.

ALDERMAN J. STEVENS, of the Sheppey Glue and Chemical Works, Ltd., fertiliser, etc., manufacturers, has accepted the mayoralty of Queenborough for another year.

PROFESSOR N. PARRAVANO, director of the Chemical Institute of the University of Rome, has been awarded the Leblanc medal of the French Chemical Society for his work on the quaternary systems.

MR. D. MILNE WATSON, governor and managing director of the Gas Light and Coke Co., Ltd., has been appointed to the Government Committee to inquire into educational methods and their relation to the requirements of trade and industry.

Mr. H. SUTCLIFFE SMITH, speaking at Bradford on Tuesday, contradicted the statement that Bradford was not supplying colours demanded by the British textile industry, and that the chief colours came from France. He contended that Bradford dyers could well meet all demands.

THE ANNUAL MEETING of the London and South-Eastern Counties Section of the Institute of Chemistry will be held on Wednesday, November 18, and not on November 19 as previously announced. Dr. Miall's paper on the Federal Council has been postponed until the January meeting. On Wednesday Mr. R. B. Pilcher gave an illustrated lecture on "Alchemists and Chemists in Arts and Literature."

A NEW WATERPROOFING PROCESS is reported to have been invented by a Bradford firm. The compound renders any fabric proof against moisture, dust, moth, and rot, and the treatment is non-inflammable and does not affect the surface or the wear of the material. The compound is manufactured ready for use in 40-gallon casks and is reported to have passed extensive tests by manufacturers.

THE INSTITUTION OF THE RUBBER INDUSTRY (Birmingham and District Section) held its first meeting at Birmingham on Thursday, October 15, when Mr. D. G. Snodgrass, M.Sc. (Dunlop Rubber Works) presented membership and associateship diplomas. The following papers were read and discussed: "A Note on Gas Black for Rubber Manufacture," by Mr. G. Gallie, B.Sc., A.I.C. (Research Association); "Tensiles of Cold Cured Rubber," by Mr. A. Zeitlin, B.Sc., A.I.C. (Rubber Department, Northern Polytechnic); and "Notes on Developments in Preparation of Raw Rubber," by Mr. W. S. Davey, B.Sc., A.I.C. (Imperial and Colonial Institute).

A COMPLETE RE-ESTABLISHMENT OF THE DYESTUFFS INDUSTRY was the subject of a speech by Sir Joseph Turner, formerly director of British Dyestuffs, Ltd., at Huddersfield, on Tuesday. He claimed that this "prince of key industries" should be definitely established by force of public opinion. To-day's output of British dyestuffs was at least ten times the pre-war output, and our 1925 output would probably be greater than the pre-war demands of the U.K., and would probably approach the total pre-war demands of the Empire. British dye manufacturers must attack their task with energy, if the industry was to be securely established.

THE USE OF LIBRARIES is the subject of a course of seven free public lectures to be held at University College, London, on Wednesdays at 5.30 p.m., the next lecture being on October 28, and subsequent lectures on November 11 and 25, January 20, February 3 and 17. London University will also hold an advanced course on library abstracting, indexing, and classification, on Tuesdays at 7 p.m. Two subjects in the third term are: "Patent Specifications: Indexing," by Dr. A. P. Thurston, and "The Literature of Chemistry" (three lectures), by Mr. A. A. Eldridge, F.I.C. Applications and details from Dr. Walter Seton, at the College, Gower Street, W.

SALES FOR THE GRASSELLI DYESTUFF CORPORATION, New York, manufacturers of dyestuffs and American sales agents for Farbenfabriken vorm. Friedk. Bayer und Co., of Leverkusen, have been taken over by General Dyestuff Corporation, New York, as from October 1. The complete staff of the Grasselli organisation will join the General Dyestuff staff, and the amalgamation is regarded as another step in the consolidation of sales interests for German dyes in America, as a means of reducing sales expenses on the present highly competitive market. Further sales consolidations and arrangements with foreign manufacturers on similar lines are believed to be pending.

THE INSTITUTE OF CHEMISTRY announces the following results of the September-October examination: Pass List: *Associateship in General Chemistry*, Chater, T. W. J., Central Technical School, Leeds; Everett, J. G., Chelsea Polytechnic; Hodgson, W. R. P., B.Sc. (Lond.), University College, Exeter; Klein, R. H., Sir John Cass Technical Institute; Phillips, M. A., Battersea Polytechnic; Richards, C. E., Northern Polytechnic and Sir John Cass Technical Institute; Richardson, R. W., Central Technical School, Leeds; Vickers, A. E. J., B.Sc. (Lond.), trained under the Head of the Chemistry Department, Central Schools of Science and Technology, Stoke-on-Trent. *Branch (e) The Chemistry (including Microscopy) of Food and Drugs and of Water:* Williams, A. L. *Examination for the Fellowship. Branch A: Inorganic Chemistry, Section II, Metallurgy:* Walker, W. J. *Branch E: The Chemistry (including Microscopy) of Food and Drugs and of Water:* Illing, E. T.

"DAYLIGHT" GLASSES which enable accurate matching and blending of delicate shades of colour by artificial light are stated to have been invented by a Viennese engineer.

ABOUT ONE HUNDRED MEMBERS of the Mining Institute of Scotland inspected the Maclaurin smokeless fuel plant at Dalmarnock last week. Glasgow Corporation are the first to put down Maclaurin plant on a commercial scale, and results were so far satisfactory.

MR. J. E. BARLOW has resigned from active service with Hardman and Holden, Ltd., chemical manufacturers, of Miles Platting, Manchester, after fifty-two years' service, during which period he was for many years sales manager. He retains his position on the board.

THE EIGHTH ANNUAL GENERAL MEETING of the British Association of Chemists will be held at the Midland Hotel, Manchester, on Saturday, October 31, at 3 p.m. The chair will be taken by Dr. E. F. Armstrong, and the annual dinner will be served at the same place at 6.30 p.m.

EDINBURGH UNIVERSITY NEWS records the appointment of the following External Examiners of theses presented for the degree of Ph.D.:—Professor V. H. Blackman, Imperial College of Science, South Kensington; Professor Morrison, St. Andrews; Professor Cathcart, Glasgow; Emeritus Professor Cowan, Aberdeen.

FIRE CAUSED SERIOUS DAMAGE at the Dalton Chemical Works, near Huddersfield, on Friday, October 16. Three tanks, each containing 3,000 gallons of benzol were found alight and two larger tanks together containing 10,000 gallons were threatened, but were eventually saved. The roof fell on to the blazing tanks and there was great danger of an explosion.

SPEAKING AT A CONFERENCE of Lancashire and Yorkshire textile representatives at Manchester on Saturday, October 17, Professor E. Midgeley, of Bradford, said that the chemistry of wool scouring, the treatment of yarns and cloths to secure new properties had been insufficiently developed. There was much scope for scientific research in the textile industry.

THE MARRIAGE took place on Tuesday, at St. Mary Abbots, Kensington, of Mr. T. E. Beacham, assistant technical director to the Stream-Line Filter Co., and a collaborator with Dr. Hele-Shaw in the Hele-Shaw Beacham transmission gear, to Miss Queenie Low, elder daughter of the late Mr. F. W. Low, Kensington. The bride who was attended by Miss Price as bridesmaid, was given away by her uncle (Mr. F. E. Bamer), and the best man was Mr. Moffett. A large company of guests included Sir John Newman, Dr. Hele-Shaw, Mr. C. S. Garland, and other prominent figures in the engineering world.

WITH THE COMPLETION of the new Wallerscote works of Brunner, Mond and Co., Ltd., Northwich, about 90 men employed on its construction have now been dismissed. This led to misleading reports that 900 of the firm's employees had been stopped and that a thousand more were to be suspended. In addition to the men engaged on the new works a number who had been employed as extra hands during the holiday season have been stopped. Labour Exchange statistics relating to Northwich, Winsford and Middlewich—all centres of chemical manufacture—show that unemployment in these districts is, on an average, about 30 per cent. greater than it was at the corresponding date of last year. On the other hand, it is about 15 per cent. less than it was at the beginning of the present year. The situation in China has undoubtedly had its effect on the exports of British chemicals.

AS REPORTED some weeks ago in THE CHEMICAL AGE, members of the staff of the Rothamsted Experimental Station are prepared to give free lectures to interested bodies. The lecturers available, and their subjects, are: Mr. H. V. Garner (manuring, etc., for farm crops), Mr. H. J. Page (green manuring), Mr. H. G. Thornton and Mr. D. W. Cutler (soil micro-organisms), Dr. Winifred E. Brenchley (agricultural botany), Mr. H. J. Page (agricultural chemistry), Dr. B. Keen and Dr. W. B. Haines (soil physics), Mr. W. G. Roach, Mr. F. Tattersfield, and Mr. C. T. Gimingham (insecticides and fungicides), Dr. A. D. Imms, Dr. J. Davidson, and Mr. D. M. T. Morland (entomology: insect pests and beekeeping), and Dr. W. B. Brierley (mycology: potato and plant diseases, soil fungi, and fungus pests). For further particulars, application should be made to the Secretary of the Station, Harpenden, Herts.

Obituary

LORD RIBBLESDALE, aged 70, director of British South African Explosives Co., Ltd., and the Explosives Trades, Ltd., and of Nobel Industries, Ltd., in London on Wednesday.

MR. J. Y. BUCHANAN, F.R.S., aged 81, in London, on Friday, October 16. He made his first reputation as a chemist and physicist of the "Challenger" expedition, during which, between 1872 and 1874, Buchanan demonstrated that *Bathybius*, which Huxley had described as a primeval slime, the most primitive form of living matter, and possibly the origin of all life, was merely a gelatinous form of sulphate of lime thrown down from the sea water by the addition of alcohol, which is used in preserving the organisms found in the deep sea deposits. On his return Buchanan established private laboratories at Edinburgh and London. He was an able chemist and mineralogist.

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TASTE.—The relation between constitution and taste of α-amino-acids. Part II. A. Heiduschka and E. Komm. *Z. angew. Chem.*, October 15, 1925, pp. 941–945.

TAUTOMERISM.—The phenomenon of tautomerism in heterocyclic compounds. G. Heller. *J. prakt. Chem.*, October, 1925, pp. 1–22.

Tautomerism among phloroglucinol derivatives. A. Sonn and W. Bülow. *Ber.*, September 16, 1925, pp. 1,691–1,698.

The tautomerism of *y*-amino-pyridine. Part II. A. E. Tschitschibabin and E. D. Ossetrowa. *Ber.*, September, 16, 1925, pp. 1,708–1,712.

THIONATES.—Polythionates. Part I. The decomposition of polythionates in aqueous solution. A. Kurtenacker and M. Kaufmann. *Z. anorg. u. allg. Chem.*, September 25, 1925, pp. 43–57.

Miscellaneous

CATALYSIS.—Investigation of gaseous catalysis by means of metals of the platinum group. L. Duparc, P. Wenger and C. Orfer. *Helv. Chim. Acta*, October 1, 1925, pp. 609–631.

The influence of phosphorus oxychloride on the catalytic reduction of acid chlorides. F. Zetzsche and O. Arnd. *Helv. Chim. Acta*, October 1, 1925, pp. 591–596.

Investigation of the catalytic dehydration of phenol-alcohol systems. Part II. Naphthol-alcohol systems. W. Plüss. *Helv. Chim. Acta*, October 1, 1925, pp. 507–512.

REDUCTION.—The mechanism of reduction. Part IV. H. J. Prins. *Rec. Trav. Chim. Pays-Bays*, October, 1925, pp. 876–888.

SUBSTITUTION.—The mechanism of substitution reactions in the aromatic nucleus. Part V. E. de B. Barnett, J. W. Cook and M. A. Matthew. *Rec. Trav. Chim. Pays-Bas*, October, 1925, pp. 894-899.

SULPHONATION.—The influence of mercury on the sulphonation of anthraquinone. A. Coppens. *Rec. Trav. Chim. Pays-Bas*, October, 1925, pp. 907–930.

Patent Literature

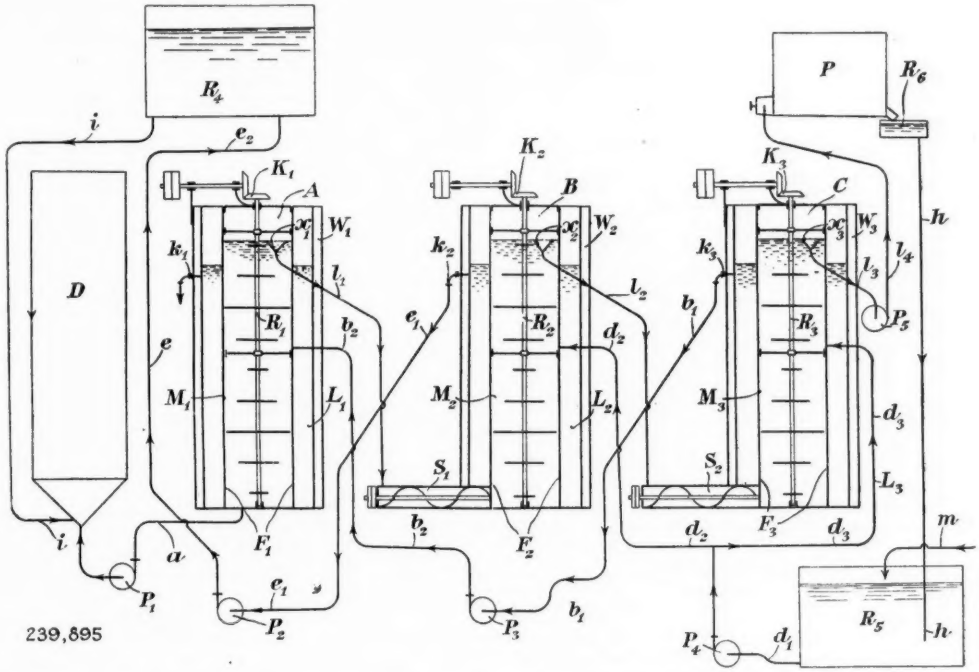
Abstracts of Complete Specifications

239,895. TRICALCIUM SACCHARATE, PROCESS FOR THE CONTINUOUS WASHING OF. C. Steffen, jun., 75, Taborstrasse, Vienna. Application date, April 15, 1924.

Three similar washing units, A, B, C are employed, each of which has an inner cylindrical container M^1 covered by a filtering cloth. This is surrounded by a cylinder L^1 providing an annular space to receive the filtered liquor, and a cooling jacket W^1 is provided. The cylinder M^1 is provided with a rotary stirrer R^1 to prevent a deposit of the trisaccharate. An overflow hopper X^1 is provided to conduct the liquid to a pipe I^1, and then to a conveyor S^1 which delivers it to the next washer.

The liquid containing the tricalcium saccharate passes from the precipitating apparatus D through a pump P^1 and pipe *a* to the container M^1, and some of the liquor passes through the filter. The pump P^3 supplies liquor from the container M^3 of the washer C through the pipes b^1, b^2 to the container M^1 at a point about half way of its height, the quantity of washing liquor being approximately equal to that which passes through the filter in M^1. This washing liquor is poorer in non-sugar content, and mixes with the more highly concentrated liquor in the container M^1, and a portion again passes through the filter. By adding washing liquor in this manner, the liquor again obtains the concentration which it had when entering the washer A, while its non-sugar content is reduced. The liquid then passes into the washer B where it is similarly treated, and the filtrate is drawn off through the pump P^2, and delivered to a tank R^4 as diluting liquid for the molasses for a subsequent precipitating process. The liquid in the container M^3 becomes more concentrated, and receives washing liquid from the tank R^5 supplied by the pump P^4. This liquor is received from the press P and its non-sugar content is very small. The product from the washer B has the same concentration as the liquor entering the washer, but the non-sugar content is still further reduced. The saccharate-containing liquid is again purified in the washer C, and the liquid passes out from the overflow X^3 and is delivered to the press P, in which the separation of the saccharate from the waste liquor is effected.

The waste liquor is used again as washing liquor after dilution with water.



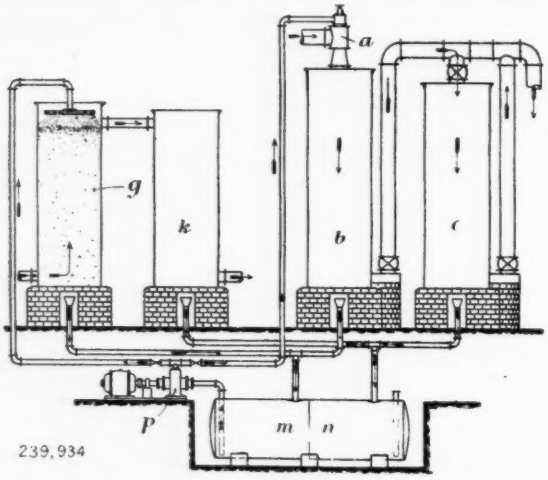
239,933. DYESTUFFS CONTAINING SULPHUR, MANUFACTURE OF. O. Y. Imray, London. From Soc. of Chemical Industry in Basle, Switzerland. Application date, June 18, 1924.

These dyestuffs are obtained by treating with an alkali polysulphide an indophenol or a leuco derivative obtainable from nitrosophenol by condensation with a diarylamine derivative containing no carboxylic group and having at least one CH_3 group in the ortho position to the >NH group and not more than one methyl group in each aryl nucleus, and also at least one free para position to the same >NH group such as ortho-tolyl-phenylamine, ortho-ortho^1-ditolylamine, ortho-para^1-ditolylamine or para^1-chloro-ortho-ortho^1-ditolylamine. These dyestuffs are dark blue powders giving blue solutions in sulphuric acid, green solutions in alkali sulphide, and brownish-yellow in alkaline hydrosulphite. Several examples are given of dyestuffs obtained from the compounds mentioned above.

239,934. AMMONIA AND AMMONIUM COMPOUNDS FROM GASES, PROCESS FOR RECOVERING. P. von der Forst, Lintfort, Kreis Moers, Germany. Application date, June 18, 1924.

This process is for recovering ammonia and ammonium compounds from gases resulting from fuel distillation which contain both free and fixed ammonia. The ammonium compounds are recovered without employing lime, in order to obtain waste liquors free from lime. The gas from the retorts is washed at a temperature above its condensation point in a device *a*, *e.g.*, a jet blower, with an aqueous solution of fixed ammonium compounds which is obtained in the process. The gas and washing liquor are then cooled or heated in a washer B to a point a little above the condensation point, *e.g.*, 78°-80° C. if the condensation point is 76° C. The liquor passes to a tank *m* and is returned to the jet blower *a* by a pump *p*. This circulating liquor is a strong solution of ammonium salts. At the temperature at which the gas leaves the washer *e*, the fixed ammonium compounds are absorbed, but the ammonia passes on. Some of the concentrated solution may be removed at intervals. The gas then passes to a second washer *c*, where the gas liquor and free ammonia are deposited and pass to a tank *n*. The ammonia liquor is steam-distilled to recover the ammonia, but no addition of lime is necessary since no fixed ammonia is

present. The concentrated solution of ammonium salts obtained in the washer *b* may be added to the ammonia saturator, or it may be passed to a scrubber *g* in which it is concentrated by means of hot air or gas to crystallise out the ammonium chloride. Any free ammonia present may be recovered by neutralising the ammonium chloride solution with hydrochloric acid. The solution is kept neutral while in the scrubber. The gases from the scrubber *g* are passed into a cooler *k* where any remaining ammonia is recovered. The hot waste liquor from the stills in which the free ammonia



239,934

is distilled off may be subjected to the action of a current of air to recover any traces of phenol. The tar and ammonium chloride separation in the washer *b* are subjected to extraction by an ammonia liquor containing no fixed ammonium compounds, so that the tar is freed from ammonium chloride. This waste liquor may be added to the washing liquor circulating in *a*.

239,951. Arseno Compounds, Production of. R. B. Ransford, London. From L. Cassella and Co., G.m.b.H., Frankfort-on-Main, Germany. Application date, June 27, 1924.

The ortho-amino-oxy-derivatives of arseno-benzene are treated with phosgene to obtain compounds in which the arseno group remains unchanged and which cannot be diazotised. These compounds can also be obtained if instead of the arseno compounds the respective arsinic acids are treated with phosgene and the benzoxazolon arsinic acids produced are reduced to the arseno compounds. Examples are given.

239,989. Coal and other Carbonaceous Matter, Method of Treating. P. Dvorkovitz, 11, Bassett Road, North Kensington. Application date, August 18, 1924. Addition to 192,816.

Specification 192,816 describes an apparatus in which coal is carbonised at temperatures between 280° C. and 500° C. by passing hot gas through the retort from top to bottom, so that the temperature at the top is greater than at the bottom. The distillates are removed at the bottom and a good yield of hydrocarbons of the paraffin series is obtained. In the present invention the retorts are provided with a device for agitating or loosening the coal during distillation. This device may be in the form of a helix which is rotated on a vertical axis or a vertical rod carrying lateral projections may be reciprocated.

240,003. Tanning Substances, Manufacture of. Farbwerke vorm. Meister, Lucius, und Brüning, Hoechst-on-Main, G. Kranzlein, Staufenstrasse, Hoechst-on-Main, and A. Voss, 11, Thalstrasse, Hoechst-on-Main, Germany. Application date, September 23, 1924. Addition to 211,145. (See The Chemical Age, Vol. X, p. 417.)

These tanning substances are produced by treating resinous condensation products derived from phenols or their homologues with an aromatic or aliphatic sulphonic acid other than an aralkyl halide sulphonic acid, which contains halogen capable of being exchanged. In a modification, a phenol sulpho-ether obtained from a phenol and a sulphonic acid of the above kind is condensed with a reactive aldehyde. The reaction may be effected under pressure. Suitable sulphonic acids include nitrochloro-benzene sulphonic acid, sulphochlorobenzoic acid, and chlorethane-sulphonic acid. In an example, the resinous condensation product obtained by the action of sulphur chloride on phenol is dissolved in caustic soda solution, mixed with sodium 1-chloro-4-nitrobenzene-2-sulphonate, and heated under pressure to 130°-140° C. The product is dissolved in hot water and slightly acidified, and may then be used for tanning purposes. In other examples, the condensation product of phenol and formaldehyde is treated with 2 : 4-chloro-sulpho-benzoic acid ; the sulphoethyl ether obtained from sodium-1-chlorethane-sulphonate and β-tetrahydronaphthol is treated with formaldehyde ; the condensation product of cresol and acetaldehyde or paraldehyde is treated with sodium 1-chloro-2-nitrobenzene-4-sulphonate.

240,051. Quinoline 4-Aldehyde and its 2-Position Aryl Derivatives, Manufacture of. W. Carpmael, London. From Chemische Fabrik auf Actien (vorm. E. Schering), 170/171, Müllerstrasse, Berlin, N.39. Application date, January 13, 1925.

These products are obtained by oxidising the corresponding 4-acrilic acid compound in alkali solution in the presence of a solvent not miscible with water which can take up and withdraw it from the alkali solution. These compounds are employed for therapeutic purposes and also as starting substances for the manufacture of other products. Examples are given.

240,087. Formamide, Manufacture of. J. Y. Johnson, London. From Badische Anilin und Soda Fabrik, Ludwigshafen-on-Rhine, Germany. Application date, May 1, 1925.

It has been found that the production of formamide by the action of ammonia on alkyl formates, which proceeds very slowly, may be caused to proceed rapidly by employing compressed ammonia in the form of gas, liquid, or strong aqueous solution. If liquid ammonia is used, the latent heat of evaporation prevents an excessive rise of temperature. When aqueous ammonia is used, some ammonium formate is also produced. The reaction between ammonia and methyl formate at 8 atmospheres pressure is complete in a few minutes, and the heat liberates the methanol produced according to the equation :—

$$HCOOCH_3 + NH_3 = HCONH_2 + CH_3OH$$

The methyl formate employed may be readily obtained by the action of carbon monoxide on methanol, or by the catalytic hydrogenation of oxides of carbon to methanol, when methyl formate is a by-product. The process may be operated continuously, the methyl formate and ammonia being introduced under pressure and the liquid formamide being continuously withdrawn through an expansion valve which causes the evaporation of the methanol. The methyl formate required may be obtained by the action of carbon monoxide on methyl alcohol in the same vessel. In this case carbon monoxide and ammonia are caused to act on methanol, either in succession or simultaneously, and an alkali metal or alcoholate accelerates the reaction. The methanol acts only as a conveying medium for carbon monoxide and ammonia. In an example, an autoclave of chromium-nickel-steel containing 20 cc. of methyl alcohol and 3 grams of sodium is heated to 50°-60° C., and 100 grams of dry ammonia added. Carbon monoxide at 150 atmospheres is then passed in until as much as possible is taken up. The excess of carbon monoxide and ammonia are drawn off, and the liquid distilled, yielding 100 grams of formamide and 20 cc. of unaltered methanol.

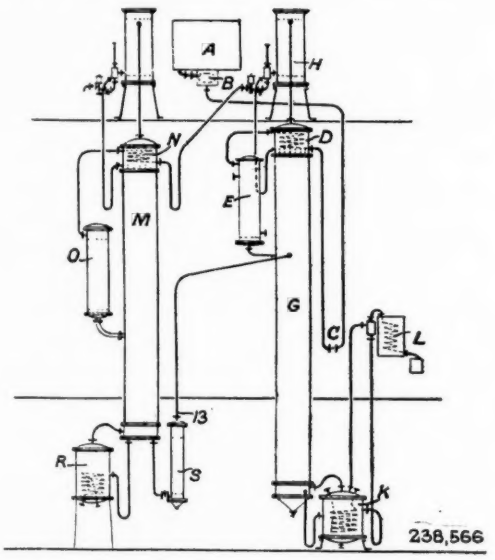
Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention :—217,900 (Soc. d'Electro-Chimie, d'Electro-Metallurgie et des Acieries Electriques d'Ugine) relating to extraction of tin from minerals, alloys, scoria, and scrap, see Vol. XI, p. 23 (Metallurgical Section) ; 219,649 (Soc. Chimique des Usines du Rhône) relating to catalysts for reduction and hydrogenation processes, see Vol. XI, p. 331 ; 222,141 (G. Austerweil) relating to the production of terpene alcohols, see Vol. XI, p. 531 ; 222,484 (F. Caspari) relating to the low-temperature distillation of brown coal, peat, etc., see Vol. XI, p. 561 ; 223,601 (R. Vidal) relating to preparation of fatty

acids and their alkali combinations, see Vol. XI, p. 669; 229,272 (Compagnie de Bethune) relating to manufacture of alcohol from ethyl sulphuric acid, see Vol. XII, p. 414; 230,487 (L. Cassella and Co. Ges.) relating to manufacture of pharmaceutical products, see Vol. XII, p. 508; 231,827 (Rheinische Kampfer-Fabrik Ges.) relating to production of inactive menthol, see Vol. XII, p. 615; 235,521 (Chemische Fabriken vorm. Weiler-ter-Meer) relating to manufacture of ethyl chloride, see Vol. XIII, p. 176.

International Specifications not yet Accepted

238,566. Rectifying acetic acid. Soc. des Etablissements L. Barbet, 5, Rue de l'Echelle, Paris. International Convention date, August 14, 1924.

Crude acetic acid passes from a tank A through valve C and preheating coil D to a tubular steam-heated evaporator E. The vapour passes into a column G, and the strong acid passes from the base of the column to a boiler K. The vapour from the boiler passes partly into the column, and partly to the



condenser L. Weak acid vapour passes from the top of the column to a condenser H, and the condensate passes to a heating coil N and vaporiser O, the vapour then passing into a column M. The concentrated acid from the base of this column passes partly to a boiler R which returns the vapour to the column, and partly to a vaporiser S which returns the vapour to the column G.

238,574. BENZANTHRONE DERIVATIVES. Farbwerke vorm. Meister, Lucius, und Brüning, Hoechst-on-Main, Germany. International Convention date, August 15, 1924.

Benzanthrone is heated with chlorbenzene and sulphur chloride, and a little iodine. The solvent is removed, and the residue extracted with sodium sulphide or alcoholic alkali, leaving benzanthronyl sulphide. The sodium salt of benzanthronyl mercaptan is salted out from the solution, and may be treated with acids to obtain the free mercaptan, with dimethyl sulphate to obtain the methyl ether, and with sodium chloroacetate to obtain the corresponding thioglycollic acid. The mercaptan may be oxidised to benzanthronyl disulphide.

LATEST NOTIFICATIONS.

241,149. Manufacture of cellulose compounds. Lilienfeld, Dr. L. October 11, 1924.

241,184. Process for the production of practically iron-free alumina. Chemische Fabrik Griesheim Electron. October 13, 1924.

241,221. Gas purification and regenerating sulphided alkaline solutions. Koppers Co. October 11, 1924.

241,232. Process of producing pure alumina and alkali carbonates or caustic alkalis. Rhenania Verein Chemischer Fabriken Akt.-Ges. October 13, 1924.

Specifications Accepted with Date of Application

223,860. Concentration of ores by froth-flotation. Minerals Separation, Ltd. October 23, 1923.

225,875. Complex gold compounds, Manufacture of. Farbwerke vorm. Meister, Lucius, und Brüning. December 7, 1923.

230,432. Ureides of hexahydrogenated aromatic and fatty aromatic carboxylic acids, Process for the preparation of. Chemische Fabrik vorm. Sandoz. March 10, 1924.

230,774. Ferric oxide, Heat process of manufacturing. O. S. Neill. March 12, 1924.

231,809. Cellulose derivatives, Manufacture of. L. Lilienfeld. April 4, 1924.

232,220. Evaporating liquids, Process and apparatus for. Niederbayerische Cellulose-werke Akt.-Ges., and A. Schneider. April 11, 1924.

232,599. Dyeing cellulose esters, Process for. Farbwerke vorm. Meister, Lucius, und Brüning. April 15, 1924.

234,078. Concentration of diluted nitrous gases, Process for. Norsk Hydro-Elektrisk Kvaelstofaktieselskab. May 15, 1924.

236,152. Tungsten powder, Manufacture of—by electrolysis. Naamlooze Vennootschap Philips' Gloeilampenfabrieken. June 27, 1924.

240,502. Fractionation of hydrocarbon oils and like liquids. R. H. Crozier. April 4, 1924.

240,514. Cellulose esters for dyeing, Treatment of. J. Y. Johnson. (*Badische Anilin und Soda Fabrik.*) June 2, 1924.

240,665. Water gas, Manufacture of. A. G. Glasgow. November 3, 1924.

Applications for Patents

Akt.-Ges. Chemischer Werte. Manufacture of quinine. 25,821. October 15. (Germany, July 8.)

Amann, A., Chemische Fabriken Dr. K. Albert Geo., and Fonrobert, E. Condensation products of ketones and phenols. 25,411. October 12.

Ayres, E. E., and Haabestad, E. H. Substitution of hydroxyl groups for the acid radicals in liquid esters, etc. 25,685. October 14. (United States, October 21, 1924.)

Badische Anilin and Soda Fabrik and Johnson, J. Y. Cooling coke. 25,808. October 15.

Badische Anilin and Soda Fabrik and Johnson, J. Y. Oxidation of fats, etc. 25,901. October 16.

Beaumont, J. H., and Metal Research Association. Manufacture of hydrogen. 25,687. October 14.

Beaumont, J. H., and Metal Research Association. Manufacture of chromium. 25,688. October 14.

Brierling, L. Manufacture of glue, etc. 25,566. October 13.

Brysilka, Ltd. Manufacture of artificial silk. 25,487. October 13.

Burmah Oil Co., Ltd., and Fraser, J. P. Purification of mineral oils, etc. 25,377. October 12.

Caird, M. N., Coombs, E., and Grimble, F. Centrifugal separators. 25,430. October 12.

Carpmael, A., Ransford, R. B., and Cassella and Co. Ges. Vat dyestuffs. 25,713. October 14.

Carpmael, W., and Farbenfabriken vorm. F. Bayer and Co. Manufacture of lithopone. 25,563. October 13.

Consumers Co., Ltd., Reynard, O., Thornley Binders, Ltd., and Thornley, Ltd., F. C. Manufacture of liquid bituminous emulsions. 25,897. October 16.

Deguide, C. Treatment of molasses, etc. 25,791. October 15.

Farbenfabriken vorm. F. Bayer and Co. Manufacture of alkali salts of the halogenated amides of aromatic sulphonic acids. 25,997. October 17. (Germany, October 18, 1924.)

Farbenfabriken vorm. F. Bayer and Co. Manufacture of mixtures yielding salts of sulphohalogenamides. 25,998. October 17. (Germany, October 18, 1924.)

Filtrators, Ltd., and Saks, V. Manufacture of an emulsion for removing scale from boilers, etc. 25,599. October 13.

Hatfield, H. S. Chemical analysis. 25,735. October 14.

Heyl, G. E. Utilisation of combustible refuse to produce cement. 25,874. October 16.

Heyl, G. E. Liquid fuel. 25,875. October 16.

Hirt, L. E. Distillation of oil. 25,451. October 12.

Imray, O. Y., and Soc. of Chemical Industry in Basle. Manufacture of vat dyestuffs, etc. 25,438. October 12.

Levy, L. A. Manufacture of cellulose acetate. 25,716. October 14.

Michel, G. Treatment of magnesium or its alloys. 26,015. October 17.

Michel, G. Manufacture of magnesium or its alloys. 26,016. October 17. (United States, February 5.)

Michel, G. Casting of magnesium and its alloys. 26,017. October 17.

Nagtegaal, J. Manufacture of active carbon. 25,695. October 14.

Parker, C. H. Distillation of coal, etc. 25,912. October 16.

Rhenania Verein Chemischer Fabriken Akt.-Ges. Production of pure alumina and alkali carbonates or caustic alkalis. 25,448. October 12. (Germany, October 13, 1924.)

Semmens, E. S. Hydrolysis of organic compounds. 25,510. October 13.

Soc. of Chemical Industry in Basle. Manufacture of dyestuffs. 25,822. October 15. (Switzerland, October 16, 1924.)

London Chemical Market

The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, October 23, 1925.

THE greater activity noted in our report last week continues, and there is much greater optimism as to the future. A number of contracts have been entered into for next year, and generally speaking the consumers are taking much more interest in the forward positions than has been the case for a long time. On the whole, prices keep remarkably steady, with few changes in value.

Export inquiry is moderately active, but much of the business offered is at unacceptable figures.

General Chemicals

ACETONE continues in good demand and position is very firm. Forward quotation is from £76 to £78 per ton, according to quantity and position.

ACID ACETIC is moderately active, technical is quoted at £37 to £38 per ton, and pure at £38 10s. to £40 for 80%, and a considerable business has been transacted in glacial for export.

ACID FORMIC is fairly active, and is quoted at from £46 to £47 per ton for 85%.

ACID LACTIC has been a bright spot, and the material is in strong demand at £43 to £44 per ton for 50% by weight. An advance in this article is not unlikely.

ACID OXALIC continues weak, but with price nominally without change at 3½d. to 3⅝d. per lb.

ALUMINA SULPHATE.—Some interest is being taken in this product, and price ranges round about £6 to £6 2s. 6d. per ton.

AMMONIUM CHLORIDE is very weak and in small demand.

ARSENIC.—There is nothing to be reported here beyond the fact that the market continues as dull as ever.

BARIUM CHLORIDE has been in better demand, and the price is now firmer at £8 10s. per ton.

BLEACHING POWDER.—Some substantial contracts have been booked at the new price.

EPSOM SALTS continues firm at £5 to £5 10s. per ton with a brisk demand.

FORMALDEHYDE is becoming very scarce indeed, and spot quotations are now £42 to £44 per ton, with an upward tendency.

LEAD ACETATE is active and inclined to rise in sympathy with the metal. White is quoted at £46 per ton, and £45 to £46 per ton for brown.

LIME ACETATE.—Business seems a little better here, but price is unchanged at about £15 per ton for grey, basis 80%.

LITHOPONE is moderately active, but price is unchanged at £20 per ton.

POTASSIUM CARBONATE and CAUSTIC are unchanged, with only poor demand.

POTASSIUM CHLORATE remains scarce, and the material readily commands 4¼d. per lb.

POTASSIUM PERMANGANATE is in very small demand and is quoted at 7¾d. per lb.

POTASSIUM PRUSSIATE is firm and the average is round about 7½d. per lb., with an active market.

SODIUM ACETATE continues quiet at £17 10s. per ton.

SODIUM BICHROMATE.—A satisfactory business has been concluded at the reduced figure.

SODIUM HYPOSULPHITE is not in such active demand and is inclined to be weaker, prices however are nominally unchanged.

SODIUM NITRITE is quiet at £22 10s. per ton.

SODIUM PRUSSIATE is fairly active and price is firm at 4½d. per lb.

SODIUM SULPHIDE has been in slightly better demand, but the outlook is uncertain.

ZINC SULPHATE.—Unchanged in value at about £14 per ton with a fairly active demand.

Coal Tar Products

The firm tone of the market for coal tar products continues and some shortage of supplies of certain products for prompt delivery is experienced.

90% BENZOL remains unchanged at 1s. 8d. per gallon on rails.

PURE BENZOL is quoted at 1s. 11d. to 2s. per gallon on rails.

CREOSOTE OIL is firm for the near position, and is quoted at 6d. per gallon on the rails in the North, while the price in the South is 7d. to 7¼d. per gallon.

CRESYLIC ACID is firm, and is somewhat scarce for prompt delivery. The value is from 1s. 6d. to 1s. 7d. per gallon on rails for the pale quality 97/99%, while the dark 95/97% is worth about 1s. 2d. per gallon on rails.

SOLVENT NAPHTHA is more or less quiet, and is quoted at 1s. 4d. per gallon on rails.

HEAVY NAPHTHA can be bought at 1s. 1d. per gallon on rails.

NAPHTHALENES have a slightly better demand, the lower grades being worth from £4 to £4 10s. per ton, while the 76/78 quality is worth about £6 per ton, and the 74/76 quality about £5 10s. per ton.

PITCH is unchanged. Fairly heavy shipments are now being made to the continent, and prices are well maintained at 40s. to 42s. 6d. per ton f.o.b. U.K. ports.

Latest Oil Prices

LONDON.—LINSEED OIL quiet and 2s. 6d. to 5s. lower for near; spot, £39 5s.; October, £38 2s. 6d.; November-December, £38 5s.; January-April, £38 7s. 6d.; May-August, £37 12s. 6d. RAPE OIL quiet. Crude, crushed, spot, £47 10s.; technical, refined, £50 10s. COTTON OIL steady. Refined common edible, £46 10s.; Egyptian, crude, £40 10s.; deodorised, £48 10s. TURPENTINE quiet and easier. American, spot, 76s. 9d.; November-December, 77s. 3d.; and January-April, 79s. per cwt., sellers.

HULL.—LINSEED OIL, spot, £39; October, £38 15s.; November-December, £38 12s. 6d.; January-April, £38 7s. 6d. COTTON OIL.—Bombay crude, £37; Egyptian crude, £39; edible, refined, £43; technical refined, £41. PALM KERNEL OIL, crushed naked 5⅛ per cent., £42 10s. GROUNDNUT OIL.—Crushed/extracted, £47 10s.; deodorised, £51 10s. SOYA OIL.—Extracted and crushed, £41 10s.; deodorised, £45. RAPE OIL.—Extracted, £46; crushed, £46 10s. per ton, net cash terms, ex mill.

Nitrogen Products Market

Export.—Since our last report the market has been very quiet, but prices are firm and unaltered.

Home.—The demand continues quiet, but prices are unaltered.

Nitrate of Soda.—This market has taken a quiet turn and the prompt values have fallen slightly to £11 8s. per ton c.i.f. European ports for October delivery. The quantity sold by the Producers' Association for shipment after June 1, 1925, is now approximately 1,631,000 tons.

American Market Movements

[From *Drug and Chemical Markets.*]

ANHYDROUS ammonia prices break sharply, aqua unsettled. Tri-sodium phosphate higher. Copper sulphate and barium carbonate down. Glauber's salt unsettled. Potash carbonate up. New butyl alcohol prices. Sodium chlorate scarce. Tin salts higher. Benzene down 1 cent per gallon. Solvent naphtha and xylenes scarce and quotations are nominal. Pyridine steady. G-salt in strong demand. Ortho-toluidine situation shows no change, although recent low prices from first hands have been mysteriously withdrawn, but it appears that they can still be done.

Trading in fine chemicals has been less active, but prices generally are steady and the market is regarded as firm. Cod-liver oil and quicksilver are easier.

Linseed oil steady. Cottonseed oil lower. Chinawood oil steady. Coconut oil remains strong. Tallow advances sharply. Greases up. Lard oil higher. Neatsfoot oil firm. Oleo oil easy.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

Acid Acetic, 40% Tech.—£20 per ton.
Acid Boric, Commercial.—Crystal, £40 per ton, Powder, £42 per ton.
Acid Hydrochloric.—3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.
Acid Nitric, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.
Acid Sulphuric.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
Ammonia Alkali.—£6 15s. per ton f.o.r. Special terms for contracts.
Bleaching Powder.—Spot, £10 10s. d/d; Contract, £8 10s. d/d, 4 ton lots.
Bisulphite of Lime.—£7 10s. per ton, packages extra, returnable.
Borax, Commercial.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)
Calcium Chlorate (Solid).—£5 12s. 6d. to £5 17s. 6d. per ton d/d, carriage paid.
Copper Sulphate.—£25 to £25 10s. per ton.
Methylated Spirit 64 O.P.—Industrial, 2s. 5d. to 2s. 11d. per gall. Mineralised, 3s. 8d. to 4s. per gall., in each case according to quantity.
Nickel Sulphate.—£38 per ton d/d.
Nickel Ammonia Sulphate.—£38 per ton d/d.
Potash Caustic.—£30 to £33 per ton.
Potassium Bichromate.—5d. per lb.
Potassium Chlorate.—3¾d. per lb., ex wharf, London, in cwt. kegs.
Salammoniac.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton. Carr. pd.
Salt Cake.—£3 15s. to £4 per ton d/d. In bulk.
Soda Caustic, Solid.—Spot lots delivered, £15 12s. 6d. to £18 per ton, according to strength; 30s. less for contracts.
Soda Crystals.—£5 to £5 5s. per ton ex railway depots or ports.
Sodium Acetate 97/98%.—£21 per ton.
Sodium Bicarbonate.—£10 10s. per ton, carr. paid.
Sodium Bichromate.—4d. per lb.
Sodium Bisulphite Powder 60/62%.—£17 per ton for home market, 1-cwt. iron drums included.
Sodium Chlorate.—3d. per lb.
Sodium Nitrate refined 96%.—£13 5s. to £13 10s. per ton, ex Liverpool.
Sodium Nitrite 100% basis.—£27 per ton d/d.
Sodium Phosphate, £14 per ton, f.o.r. London, casks free.
Sodium Sulphate (Glauber Salts).—£3 12s. 6d. per ton.
Sodium Sulphide conc. solid. 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. pd.
Sodium Sulphide Crystals.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. pd.
Sodium Sulphite, Pea Crystals.—£14 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

Acid Carbolic Crystals.—4¾d. per lb. Crude 60's, 1s. 3d. to 1s. 4d. Very poor demand.
Acid Cresylic 97/99.—1s. 4d. to 1s. 6d. per gall. Steady, with more inquiry. Pale, 95%, 1s. 3d. to 1s. 5d. per gall. Dark, 1s. 1d. to 1s. 6d. per gall.
Anthracene Paste 40%.—3d. per unit per cwt.—Nominal price. No business.
Anthracene Oil, Strained.—9½d. per gall. Good inquiry. Unstrained, 7d. to 7½d. per gall.
Benzol.—Crude 65's.—11d. to 1s. 3d. per gall., ex works in tank wagons. Standard Motor, 1s. 8d. to 1s. 10d. per gall., ex works in tank wagons. Pure, 1s. 11d. to 2s. 3d. per gall., ex works in tank wagons. Firm.
Toluol.—90%, 1s. 9d. per gall. More inquiry. Pure, 1s. 11d. to 2s. 2d. per gall.
Xylol Commercial.—1s. 11d. per gall. Pure, 2s. per gall.
Creosote.—Cresylic, 20/24%, 8d. per gall. Market very quiet. Standard specification, 7d. to 7½d. per gall.; middle oil, heavy, 5¾d. to 6d. per gall. Market steady.
Naphtha.—Solvent 90/160, 1s. 6d. to 1s. 10d. per gall. Fair business. Solvent 90/190, 1s. to 1s. 1d. per gall. Moderate demand.
Naphthalene Crude.—Drained Creosote Salts, £3 15s. to £5 per ton. Whizzed or hot pressed, £4. Better inquiry.
Naphthalene.—Crystals and Flaked, £12 to £13 per ton, according to districts.
Pitch.—Medium soft, 42s. to 47s. per ton, according to district. Moderate demand.
Pyridine.—90/160, 18s. 6d. to 19s. per gall. Weaker. Heavy, 11s. to 11s. 6d. per gall. Market quiet.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated.

Acetic Anhydride 95%.—1s. 7d. per lb.
Acid Amidonaphthol disulpho (1-8-2-4).—10s. 9d. per lb.
Acid Anthranilic.—7s. per lb. 100%.
Acid Benzoic.—1s. 9d. per lb.
Acid Gamma.—9s. per lb.
Acid H.—3s. 6d. per lb. 100% basis d/d.
Acid Naphthionic.—2s. 2d. per lb. 100% basis d/d.
Acid Neville and Winther.—4s. 10d. per lb. 100% basis d/d.
Acid Sulphanilic.—8½d. per lb. 100% basis d/d.
Aluminium Chloride, anhydrous.—10d. per lb. d/d.
Aniline Oil.—7d. per lb. naked at works.
Aniline Salts.—7d. per lb. naked at works.
Antimony Pentachloride.—1s. per lb. d/d.
Benzaldehyde.—2s. 1½d. per lb. Good home inquiry.
Benzidine Base.—3s. 6d. per lb. 100% basis d/d.
Benzyl Chloride 95%.—1s. 1d. per lb.
p-Chlorphenol.—4s. 3d. per lb. d/d.
p-Chloraniline.—3s. per lb. 100% basis.
o-Cresol 29/31° C.—3d. per lb. Demand quiet.
m-Cresol 98/100%.—2s. 1d. per lb. Demand moderate.
p-Cresol 32/34° C.—2s. 1d. per lb. Demand moderate.
Dichloraniline.—2s. 3d. per lb.
Dichloraniline S. Acid.—2s. 3d. per lb. 100% basis.
Diethylaniline.—4s. 3d. per lb. d/d., packages extra, returnable.
Dimethylaniline.—2s. per lb. d/d. Drums extra.
Dinitrobenzene.—9d. per lb. naked at works.
Dinitrochlorbenzene.—£84 10s. per ton d/d.
Dinitrotoluene.—48/50° C. 8d. to 9d. per lb. naked at works. 66/68° C. 1s. per lb. naked at works.
Diphenylaniline.—2s. 10d. per lb. d/d.
G. Salt.—2s. 2d. per lb. 100% basis d/d.
a-Naphthol.—1s. 10d. per lb. d/d. Fair home inquiry.
B-Naphthol.—1s. per lb. d/d. Fair home inquiry.
a-Naphthylamine.—1s. 3d. per lb. d/d. Fair home inquiry.
B-Naphthylamine.—3s. 9d. per lb. d/d. Fair home inquiry.
m-Nitraniline.—3s. 9d. per lb. d/d.
p-Nitraniline.—1s. 11d. per lb. d/d. Fair home inquiry.
Nitrobenzene.—5d. per lb. naked at works. Good home inquiry.
o-Nitrochlorbenzol.—2s. 3d. per lb. 100% basis d/d.
Nitronaphthalene.—10d. per lb. d/d.
p-Nitrophenol.—1s. 9d. per lb. 100% basis d/d.
p-Nitro-*o*-amido-phenol.—4s. 6d. per lb. 100% basis.
m-Phenylene Diamine.—4s. per lb. d/d.
p-Phenylene Diamine.—9s. 9d. per lb. 100% basis d/d.
R. Salt.—2s. 4d. per lb. 100% basis d/d.
Sodium Naphthionate.—1s. 7½d. to 1s. 8d. per lb. 100% basis d/d.
o-Toluidine.—8d. per lb. Good home inquiry.
p-Toluidine.—2s. 3d. per lb. naked at works.
m-Toluylene Diamine.—4s. per lb. d/d.

Wood Distillation Products

Acetate of Lime.—Brown £8. Quiet market. Grey, £14 10s. per ton. Liquor, 9d. per gall. 32° Tw.
Acetone.—£73 per ton.
Charcoal.—£7 to £9 per ton, according to grade and locality. Demand fair.
Iron Liquor.—1s. 7d. per gall. 32° Tw. 1s. 2d. per gall, 24° Tw.
Red Liquor.—10d. to 1s. per gall. 15° Tw.
Wood Creosote.—2s. 7d. per gall. Unrefined.
Wood Naphtha, Miscible.—5s. per gall. 60% O.P. Solvent, 4s. 6d. per gall. 40% O.P. Very quiet.
Wood Tar.—£3 15s. to £5 per ton, according to grade.
Brown Sugar of Lead.—£40 per ton.

Rubber Chemicals

Antimony Sulphide.—Golden, 7½d. to 1s. 5d. per lb., according to quality, Crimson, 1s. 5d. to 1s. 7½d. per lb., according to quality.
Arsenic Sulphide, Yellow.—2s. per lb.
Barytes.—£3 10s. to £6 15s. per ton, according to quality.
Cadmium Sulphide.—4s. 4d. per lb.
Carbon Bisulphide.—£25 to £28 per ton, according to quantity.
Carbon Black.—5½d. per lb., ex wharf.
Carbon Tetrachloride.—£55 to £60 per ton, according to quantity, drums extra.
Chromium Oxide, Green.—1s. 3d. per lb.
Diphenylguanidine, 4s. to 4s. 3d. per lb.
Indiarubber Substitutes, White and Dark.—5¾d. to 6¾d. per lb.
Lamp Black.—£43 per ton, barrels free.
Lead Hyposulphite.—9d. per lb.
Lithopone, 30%.—£22 10s. per ton.
Mineral Rubber "Rubpron."—£13 12s. 6d. per ton f.o.r. London.
Sulphur.—£9 to £11 per ton, according to quality.

Sulphur Chloride.—4d. per lb., carboys extra.
Sulphur Precip. B.P.—£50 to £55 per ton.
Thiocarbamide.—2s. 6d. to 2s. 9d. per lb.
Thiocarbanilide.—2s. 1d. to 2s. 3d. per lb.
Vermilion, Pale or Deep.—5s. per lb.
Zinc Sulphide.—1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

Acid, Acetic, 80 % B.P.—£39 per ton ex wharf London in glass containers.
Acid, Acetyl Salicylic.—2s. 6½d. to 2s. 8d. per lb. Keen competition continuing. Good demand.
Acid, Benzoic B.P.—2s. to 2s. 3d. per lb., according to quantity.
Acid, Boric B.P.—Crystal £46 per ton, Powder £50 per ton. Carriage paid any station in Great Britain.
Acid, Camphoric.—19s. to 21s. per lb.
Acid, Citric.—1s. 4d. per lb., less 5%. Unsettled.
Acid, Gallic.—2s. 9d. per lb. for pure crystal, in cwt. lots.
Acid, Pyrogallic, Crystals.—5s. 4d. to 5s. 6d. per lb.
Acid, Salicylic.—1s. 3d. to 1s. 4½d. per lb. Technical.—10½d. to 11d. per lb.
Acid, Tannic B.P.—2s. 10d. per lb.
Acid, Tartaric.—1s. 0½d. per lb., less 5%. Market firm.
Amidol.—6s. 6d. per lb., d/d.
Acetanilide.—1s. 5d. per lb. for quantities.
Amidopyrin.—12s. 9d. per lb.
Ammonium Benzoate.—3s. 3d. to 3s. 6d. per lb., according to quantity.
Ammonium Carbonate B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks.
Atropine Sulphate.—11s. 6d. per oz. for English make.
Barbitone.—10s. 3d. to 10s. 6d. per lb.
Benzonaphthol.—3s. 3d. per lb. spot.
Bismuth Carbonate.—12s. 9d. to 14s. 9d. per lb.
Bismuth Citrate.—11s. 4d. to 13s. 4d. per lb.
Bismuth Salicylate.—10s. 2d. to 12s. 2d. per lb.
Bismuth Subnitrate.—10s. 9d. to 12s. 9d. per lb. according to quantity.
Borax B.P.—Crystal £29, Powder £30 per ton. Carriage paid any station in Great Britain.
Bromides.—Potassium, 1s. 10d. to 2s. per lb.; sodium, 2s. 1d. to 2s. 3d. per lb.; ammonium, 2s. 5d. to 2s. 7d. per lb., all spot. British or Imported. Firm.
Calcium Lactate.—1s. 4d. to 1s. 6d. B.P. 2s. 8d. to 3s., according to quantity.
Chloral Hydrate.—3s. 5d. to 3s. 6d. per lb., duty paid.
Chloroform.—2s. 5½d. to 2s. 7½d. per lb., according to quantity.
Creosote Carbonate.—6s. per lb.
Formaldehyde.—£41 per ton, in barrels ex wharf.
Glycerophosphates.—Fair business passing. Calcium, soluble and citrate free, 7s. per lb.; iron, 8s. 9d. per lb.; magnesium, 9s. per lb.; potassium, 50%, 3s. 6d. per lb.; sodium, 60%, 2s. 6d. per lb.
Guaiacol Carbonate.—6s. to 7s. per lb.
Hexamine.—2s. 5d. per lb.
Homatropine Hydrobromide.—30s. per oz.
Hydrastine Hydrochloride.—English make offered at 120s. per oz.
Hydrogen Peroxide (12 vols.).—1s. 8d. per gallon f.o.r. makers' works, naked.
Hydroquinone.—4s. 4½d. per lb., in cwt. lots.
Hypophosphites.—Calcium, 3s. 6d. per lb., for 28 lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
Iron Ammonium Citrate B.P.—1s. 8d. to 1s. 11d. per lb. Green, 2s. 2d. to 2s. 7d. per lb. U.S.P., 1s. 7d. to 1s. 10d. per lb.
Magnesium Carbonate.—Light Commercial, £33 per ton net.
Magnesium Oxide.—Light Commercial, £70 per ton, less 2½%, price reduced; Heavy Commercial, reduced to £23 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d. per lb., according to quantity.
Menthol.—A.B.R. recrystallised B.P., 46s. net per lb., October delivery. Synthetic, 22s. 6d. to 27s. 6d. per lb., according to quality. English make.
Mercurials.—Red oxide, 5s. 2d. to 5s. 4d. per lb.; Corrosive sublimate, 3s. 7d. to 3s. 9d. per lb; white precipitate, 4s. 6d. to 4s. 8d. per lb.; Calomel, 3s. 10d. to 4s. per lb. Still quiet.
Methyl Salicylate.—1s. 8d. per lb. Demand increasing, price firmer.
Methyl Sulphonal.—17s. 6d. per lb.
Metol.—9s. per lb. British make.
Paraformaldehyde.—1s. 9d. for B.P. quality.
Paraldehyde.—1s. 4½d. per lb., in free bottles and cases.
Phenacetin.—4s. to 4s. 3d. per lb.
Phenazone.—6s. to 6s. 3d. per lb. Spot lower than forward price.
Phenolphthalein.—4s. to 4s. 3d. per lb. Supply exceeds demand.
Potassium Bitartrate 99/100% (Cream of Tartar).—80s. per cwt., less 2½% for ton lots. Market very firm.
Potassium Citrate.—1s. 7d. to 1s. 10d. per lb.
Potassium Ferricyanide.—1s. 8d. to 1s. 9d. per lb. Quiet.
Potassium Iodide.—16s. 8d. to 17s. 5d. per lb., according to quantity. Steady market.
Potassium Metabisulphite.—7½d. per lb., 1-cwt. kegs included, f.o.r. London.
Potassium Permanganate.—B.P. crystals, 7½d. per lb., spot. Slightly easier.
Quinine Sulphate.—2s. 3d. to 2s. 4d. per oz., in 100 oz. tins. Steady market.
Resorcin.—3s. 10½d. per lb. In fair quantities.
Saccharin.—63s. per lb. in 50 lb. lots. Fair demand.
Salol.—3s. 3d. to 3s. 6d. per lb.
Silver Proteinate.—12s. per lb. for satisfactory product light in colour.
Sodium Benzoate, B.P.—1s. 10d. to 2s. 2d. per lb.
Sodium Citrate, B.P.C., 1911.—1s. 4d. to 1s. 7d. per lb., B.P.C., 1923. 1s. 7d. to 1s. 10d. per lb., according to quantity.
Sodium Hyposulphite, Photographic.—£14 to £15 per ton, according to quantity, d/d consignee's station in 1-cwt. kegs.
Sodium Metabisulphite Crystals.—37s. 6d. to 60s. per cwt., net cash, according to quantity.
Sodium Nitroprusside.—16s. per lb.
Sodium Potassium Tartrate (Rochelle Salt).—75s. to 80s. per cwt., according to quantity.
Sodium Salicylate.—Powder, 1s. 11d. to 2s. 1d. per lb. Crystal, 2s. to 2s. 2d. per lb. Flake, 2s. 2d. to 2s. 6d. per lb.
Sodium Sulphide, pure recrystallised.—10d. to 1s. 2d. per lb.
Sodium Sulphite, anhydrous, £27 10s. to £28 10s. per ton, according to quantity; 1-cwt. kegs included.
Sulphonal.—12s. per lb. Limited demand.
Thymol.—13s. to 15s. per lb.

Perfumery Chemicals

Acetophenone.—9s. per lb.
Aubepine (ex Anethol).—11s. per lb.
Amyl Acetate.—3s. per lb.
Amyl Butyrate.—6s. 6d. per lb.
Amyl Salicylate.—3s. 1½d. per lb.
Anethol (M.P. 21/22° C.).—6s. 6d. per lb.
Benzyl Acetate from Chlorine-free Benzyl Alcohol.—2s. 4d. per lb.
Benzyl Alcohol free from Chlorine.—2s. 4d. per lb.
Benzaldehyde free from Chlorine.—2s. 9d. per lb.
Benzyl Benzoate.—2s. 9d. per lb.
Cinnamic Aldehyde Natural.—15s. 6d. per lb.
Coumarin.—13s. per lb.
Citronellol.—16s. per lb.
Citral.—10s. per lb.
Ethyl Cinnamate.—9s. per lb.
Ethyl Phthalate.—3s. per lb.
Eugenol.—9s. 6d. per lb.
Geraniol (Palmarosa).—23s. 6d. per lb.
Geraniol.—8s. to 16s. per lb.
Heliotropine.—6s. 3d. per lb.
Iso Eugenol.—14s. 6d. per lb.
Linalol ex Bois de Rose.—18s. per lb.
Linalyl Acetate.—18s. per lb.
Methyl Anthranilate.—9s. 3d. per lb.
Methyl Benzoate.—5s. per lb.
Musk Ketone.—40s. 6d. per lb.
Musk Xylol.—6s. per lb.
Nerolin.—4s. per lb.
Phenyl Ethyl Acetate.—14s. per lb.
Phenyl Ethyl Alcohol.—11s. 6d. per lb.
Rhodinol.—36s. 6d. per lb.
Safrol.—1s. 4d. per lb.
Terpineol.—1s. 8d. per lb.
Vanillin.—21s. 6d. to 23s. 6d. per lb. Good demand.

Essential Oils

Almond Oil.—12s. 6d. per lb.
Anise Oil.—3s. 6d. per lb.
Bergamot Oil.—27s. 6d. per lb.
Bourbon Geranium Oil.—16s. per lb.
Camphor Oil.—60s. per cwt.
Cananga Oil, Java.—11s. 3d. per lb.
Cinnamon Oil, Leaf.—5d. per oz.
Cassia Oil, 80/85%.—10s. 3d. per lb.
Citronella Oil.—Java, 85/90%, 3s. 7d.; Ceylon, 2s. 6d. per lb.
Clove Oil.—7s. 6d. per lb.
Eucalyptus Oil, 70/75%.—1s. 10d. per lb.
Lavender Oil.—French 38/40% Esters, 30s. per lb.
Lemon Oil.—6s. 9d. per lb.
Lemongrass Oil.—4s. 9d. per lb.
Orange Oil, Sweet.—10s. 9d. per lb.
Otto of Rose Oil.—Bulgarian, 60s. per oz. Anatolian, 35s. per oz.
Palma Rosa Oil.—13s. 9d. per lb.
Palma Rose Oil.—15s. 3d. per lb.
Peppermint Oil.—Wayne County. 75s. for shipment from U.S.A. Japanese, 28s. 9d. per lb. Firm.
Petitgrain Oil.—9d. per lb.
Sandal Wood Oil.—Mysore, 26s. per lb. Australian, 18s. 6d. per lb.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, October 23, 1925.

IN the heavy chemical market business remains fairly satisfactory. With the substantial concession to consumers of bleaching powder advised in our last report, manufacturers have found little difficulty in the renewal of contracts for next year. The same also applies, in a lesser degree, to caustic soda.

Continental offers remain at about the same as last reported.

Industrial Chemicals

ACID ACETIC.—In usual steady demand. 98/100% quoted £55 to £67 per ton according to quality and packing, c.i.f. U.K. ports; 80% pure, £40 to £42 per ton; 80% technical, £38 to £40 per ton, packed in casks c.i.f. U.K. ports.

ACID BORIC.—Crystal, granulated or small flaked, £40 per ton; powdered, £42 per ton, packed in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—Demand rather poor and price reduced to about 4½d. per lb., delivered or f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—In good demand and price advanced to about 1s. 3½d. per lb., less 5% ex store.

ACID FORMIC, 85%.—Quoted £46 per ton, ex wharf. Prompt shipment from the continent.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy ex works.

ACID NITRIC, 80°.—Remains unchanged at £23 5s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—Spot material unchanged at about 3½d. per lb., ex wharf. Offered for prompt shipment from the continent at 3¾d. per lb. c.i.f. U.K. ports duty paid.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Unchanged at about 11½d. per lb., less 5% ex wharf early delivery.

ALUMINA SULPHATE, 17/18%, IRON FREE.—Quoted £6 15s. per ton, ex store, spot delivery. Offered for prompt shipment from the continent at £6 5s. per ton c.i.f. U.K. ports.

ALUM, LUMP POTASH.—Rather cheaper quotations from the continent. Now quoted £7 15s. per ton c.i.f. U.K. ports. Spot material available at £9 2s. 6d. per ton, ex store. White powdered quoted from the continent at £7 12s. 6d. per ton c.i.f. U.K. ports.

AMMONIA ANHYDROUS.—In moderate demand and price unchanged at 1s. 4½d. per lb. less 5% ex station. Containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton. Packed in 5 cwt. casks delivered U.K. ports.

AMMONIA LIQUID, 880°.—In usual steady demand and price unchanged at 2½d. to 3d. per lb. delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals now quoted £27 10s. per ton, ex station. Offered from the continent at about £23 5s. per ton c.i.f. U.K. ports. Fine white crystals quoted £19 5s. per ton c.i.f. U.K. ports.

ARSENIC, REFINED WHITE CORNISH.—Nominally £20 per ton, ex wharf early delivery, but this price could probably be shaded for reasonably large parcels. Spot material available at about £22 10s. per ton, ex store.

BARIUM CHLORIDE.—Large crystals now offered on spot at about £9 5s. per ton, ex store. Fine white crystals on offer from the continent at about £7 5s. per ton c.i.f. U.K. ports.

BLEACHING POWDER.—English material quoted £9 10s. per ton, ex station, contracts 20s. per ton less. Offered from the continent at £8 2s. 6d. per ton c.i.f. U.K. ports.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton c.i.f. U.K. ports.

BORAX.—Granulated £24 10s. per ton; crystals, £25 per ton; powdered, £26 per ton. Carriage paid U.K. stations.

CALCIUM.—English manufacturers' price unchanged at £5 12s. 6d. to £5 17s. 6d. per ton carriage paid U.K. stations. Continental now on offer at £3 15s. per ton c.i.f. U.K. ports.

COPPERAS, GREEN.—In good demand for export. Prices unchanged at about £3 7s. 6d. per ton f.o.b. U.K. ports, packed in casks.

COPPER SULPHATE.—Spot material available at about £23 10s. per ton, ex wharf. English for export quoted £24 10s. per ton f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Quoted £39 15s. per ton c.i.f. U.K. ports. Prompt shipment. Spot material available at £40 per ton, ex store.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental quoted £2 17s. 6d. per ton, c.i.f. U.K. ports.

LEAD, RED.—Imported material now quoted £44 5s. per ton, ex store.

LEAD, WHITE.—Unchanged at about £44 10s. per ton, ex store, spot delivery.

LEAD ACETATE.—White crystals offered from the continent at about £44 10s. per ton c.i.f. U.K. ports; brown about £38 10s. per ton c.i.f. U.K. ports. White crystals offered on spot at about £45 5s. per ton, ex store.

MAGNESITE, GROUND CALCINED.—In moderate demand and price unchanged at about £8 15s. per ton, ex station.

POTASH CAUSTIC, 88/92%.—Syndicate prices unchanged at £27 10s. per ton c.i.f. U.K. ports. Spot material available at about £29 10s. per ton, ex store.

POTASSIUM BICHROMATE.—Price now 4½d. per lb. delivered.

POTASSIUM CARBONATE, 96/98%.—On offer from the continent at about £25 15s. per ton c.i.f. U.K. ports. Spot material available at £26 10s. per ton, ex store.

POTASSIUM CHLORATE, 98/100%.—Offered from the continent at £30 per ton c.i.f. U.K. port for powdered; £32 10s. crystals. Only small quantities available for near delivery.

POTASSIUM NITRATE, SALTPETRE.—99% refined granulated quoted £24 15s. per ton, c.i.f. U.K. ports. Spot material available at about £27 5s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Spot material quoted 8d. per lb., ex store. Offered for early delivery at 7¾d. per lb., ex wharf.

POTASSIUM PRUSSIATE, YELLOW.—Good inquiry and price unchanged at about 7½d. per lb., ex store. Offered for early shipment from the continent at about 7¼d. per lb., ex wharf.

SODA CAUSTIC.—76/77% now £17 10s. per ton; 70/72%, £16 2s. 6d. per ton.; broken 60%, £16 12s. 6d. per ton; powdered 98/99%, £20 17s. 6d. per ton. All carriage paid U.K. stations, spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—Spot material unchanged at about £18 15s. per ton, ex store. Quoted £18 per ton c.i.f. U.K. ports, prompt shipment from the continent.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM CARBONATE, SODA CRYSTALS.—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality, £1 7s. 6d. per ton more; alkali 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture unchanged at £9 10s. per ton, ex station, minimum ton lots. Pea crystals, £14 per ton, ex station. Continental commercial quality quoted £9 5s. per ton, ex store.

SODIUM NITRATE.—Quoted £13 per ton, ex store. 96/98% refined quality, 7s. 6d. per ton extra.

SODIUM NITRITE 100%.—Quoted £24 per ton, ex store. Offered from the continent about £22 5s. per ton c.i.f. U.K. ports.

SODIUM PRUSSIATE YELLOW.—Spot lots quoted at 4d. per lb., ex store. Continental material quoted, ex wharf, at about the same figure.

SODIUM SULPHATE, SALTCAKE.—Price for home consumption; £3 10s. per ton f.o.r. works. Good inquiry for export and higher prices obtainable.

SODIUM SULPHIDE.—English material: solid 60/62% now £13 per ton; broken £14 per ton; flake, £15 per ton; crystals £8 10s. per ton. Carriage paid U.K. stations, minimum four-ton lots with slight reductions for contracts to the end of the year. 60/62% solid offered from the continent at £10 15s. per ton c.i.f. U.K. ports; broken, £1 per ton more; 30/32% crystals, £7 15s. per ton c.i.f. U.K. ports.

SULPHUR.—Flowers, £10 10s.; roll, £9 10s.; rock, £9 7s. 6d.; ground, £9 10s., per ton, ex store, spot delivery. Prices nominal.

ZINC CHLORIDE, 98/100%.—On offer from the continent at about £23 10s. per ton c.i.f. U.K. ports. 96/98% quality of English manufacture quoted about £23 10s. per ton f.o.b. U.K. ports.

ZINC SULPHATE.—Of continental manufacture on offer at about £11 15s. per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ALPHA NAPHTHYLAMINE.—1s. 3d. per lb. Fair home inquiries.

SODIUM NAPHTHIONATE.—1s. 8d. to 1s. 9d. per lb. Fair home inquiries.

GAMMA ACID.—7s. 3d. per lb. Fair home inquiries.

SULPHANILIC ACID.—8½d. to 9d. per lb. Good home inquiries.

PARANITRANILINE.—1s. 8d. to 1s. 9d. per lb. Some home inquiries.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, October 23, 1925.

The home demand for chemicals on the Manchester market this week has been on quietly steady lines, with most of the business confined to spot or near delivery lots, though a fair amount of interest is being shown in contract deliveries over next year. Following the cut in makers' prices for bichromates on 1926 contracts comes the news of reductions in next year's prices for caustic soda and bleaching powder. Export demand for chemicals is on quiet lines, the Dominions accounting for the greater share of the business that is being put through.

Heavy Chemicals

The demand for saltcake is still very slow, although prices, at £3 10s. to £3 12s. 6d., are not changed from last report. Glauber salts are likewise slow, with values maintained at round £3 10s. per ton. A quiet demand for chlorate of soda is being experienced and prices are rather easier, the product being on offer at 2¾d. per lb. or a shade less. Hyposulphite of soda is selling slowly at about £14 10s. per ton for photographic crystals and £9 5s. to £9 10s. for commercial. Acetate of soda is only moderately active at £17 10s. to £18 per ton. Soda crystals are still quoted at £5 5s. per ton with the volume of business maintained at its recent level. Sulphide of soda attracts only a moderate amount of attention and values are inclined to favour buyers; 60-65 per cent. concentrated solid is offering at £11 15s. per ton and commercial quality at £9 5s. to £9 10s. Bichromate of soda is in quiet request at 4d. per lb.; as stated last week, 1926 contract deliveries have been reduced to 3½d. Caustic soda is in quietly steady demand for home and export at from £15 12s. 6d. per ton for 60 per cent. strength to £18 for 76-77 per cent., next year's prices having been fixed at 10s. per ton less. Bicarbonate of soda is unchanged from last week at £10 10s. per ton. Phosphate of soda is a rather slow section of the market and quotations are easy at £12 10s. per ton. Prussiate of soda is held at about 4d. per lb., a moderate inquiry being met with. Alkali is steady and in fairly good request at £6 15s. per ton. Bleaching powder is quoted at £9 10s. per ton, and over next year a cut of 20s. per ton is announced.

Permanganate of potash is quiet and easy at about 7¾d. per lb. for pharmaceutical and round 5½d. for commercial quality. Caustic potash is about unchanged at £28 10s. to £29 per ton for 96-98 per cent. material, with demand on rather quiet lines. Carbonate of potash is fairly active with values steady at £25 to £25 10s. per ton. Chlorate of potash is still quoted at about 4d. per lb., but business is rather restricted. Bichromate of potash is slow at 5d. per lb., and a halfpenny less for 1926 contracts. Yellow prussiate of potash meets with a fair amount of inquiry and prices are maintained at round 7¼d. per lb.

Arsenic continues inactive and values are still weak, though on about the same level as at last report, white powdered, Cornish makes, being quoted at about £16 10s. per ton at mines. Sulphate of copper attracts a moderate amount of attention at £24 to £24 10s. per ton. Acetate of lime is in quiet demand at £14 10s. per ton for grey and £7 10s. to £8 for brown. Acetate of lead is slow, but steady at £44 to £45 for white and about £40 for brown material. Nitrate of lead is in limited demand at £41 to £42 per ton. Epsom salts are still quoted at £3 15s. per ton, with business slow; magnesium sulphate, B.P. quality, is on offer at round £5 5s. per ton.

Acids and Coal Tar Products

Acetic acid is selling in moderate quantities and values are fairly steady at £37 to £38 per ton for 80 per cent. commercial quality and £66 10s. for glacial. Oxalic acid is quiet and easy at 3¼d. per lb. Citric acid is not very active though quotations still range round 1s. 3d. per lb. Tartaric acid is in small demand at about 11½d. per lb.

Pitch still attracts comparatively little attention with values nominal at round 40s. per ton. Carbolic acid is in very small demand at 1s. 3d. per gallon for crude and about 4½d. per lb. for crystals. Creosote oil is steady at 6d. to 6¼d. per gallon, and demand is pretty good. Naphthalenes are quiet at £12 to £13 per ton for refined qualities and £4 and upwards for crude. Solvent naphtha is still quoted at 1s. 5½d. to 1s. 6d. per gallon.

Chemical Properties of Nicotine

Uses as an Insecticide

In an article published in *The Times* on Tuesday, the late Professor Maxwell Lefroy described nicotine as an insecticide which will render plants immune. The fermented tobacco plant, he wrote, yields an alkaloid, nicotine, which is pre-eminent as an insect poison, killing small insects when brought in contact with their bodies. Its immense use as an insecticide is due to a combination of physical and chemical characters. It is slightly soluble in water, easily combined with soap solutions; it is what the chemist calls "basic," and so combines with acids to form neutral salts, which are soluble and easily applied to the plant.

The peculiar chemical grouping of the nitrogen atom in the complex molecule makes it readily absorbed by the nitrogen fat compounds that make up nerve tissue, and so nicotine is taken up by the insect nerve structure, entirely stops further absorption of oxygen, and kills the insect. The fact that nicotine is basic, that it forms neutral salts, means in practice that it will not injure delicate plant tissue—so that you can spray the most delicate of crop plants, hops, with it and do no damage. A common formula for a nicotine wash, as used on hops, is 6 lb. to 10 lb. of soft soap with 6 oz. to 10 oz. of nicotine per 100 gallons of liquid, ready to spray on. No other substance compares with this in toxicity, and, even if the cost is high, the certainty of killing power, with the immunity from damage to the most delicate plant, has made nicotine the most useful insecticide for horticultural purposes.

Synthetic Nicotine

Nicotine is used mainly against such pests as greenfly (*Aphides*), white fly (*Aleurodes*), the softer scale insects (*Coccids*), thrips, and such larger sucking insects as the Capsid bugs which in this country attack apple, as well as the apple sucker (*Psyllids*). Its application against caterpillars is limited, and it is without effect against most other horticultural pests. Nicotine has never been synthetically produced. Its price, about 12s. per pound, does not encourage efforts in that direction. And the possible coal-tar derivatives, such as pyrsidine, quinoline, and other nitrogenous bodies related to nicotine, have very little killing power. The future lies with the tobacco-growers. Will it pay to grow tobaccos which, on fermentation, yield higher nicotine amounts, for purely insecticidal uses, or will nicotine become so small a fraction of the wastes as to stimulate production of artificial nicotine substitutes which, while not nicotines, are equally good insecticides? It may well be that a synthetic product, or one of the other plant alkaloids, will ultimately displace nicotine.

Price Control in the Pharmacy Trade

The Evils of Price Cutting

Sir William S. Glyn-Jones, Secretary of the Proprietary Articles Trade Association, in his address to members of the Incorporated Sales Managers' Association of the United Kingdom at the Old Colony Club, Aldwych, last week, on his return from a visit to Canada, stated that he found conditions there as regards price cutting as chaotic as they were in this country thirty years ago. There was an atmosphere of distrust, jealousy, and want of co-operation between the manufacturer, wholesaler, and retailer, undoubtedly due to price cutting. As an experiment he purchased the same article in three different places at three different prices. After an enthusiastic meeting of manufacturers it was decided to form a P.A.T.A. in Montreal, and between 40 and 50 stated their intention of joining.

Eighty thousand firms in this country, he stated, were selling goods at controlled prices which left a fair margin of profit for the retailer and wholesaler, and his investigations proved that if the retailer cut the prices of goods and did not sell at a reasonable profit he was bound to cheat the public somewhere. He emphasised the fact that it was essential for the manufacturer to ask a reasonable, and not an exorbitant price for his products, and that the public were undoubtedly better served and preferred to purchase goods that were branded and controlled in price.

Company News

ANGELA NITRATE CO., LTD.—An interim dividend of 10 per cent., less tax, is announced, payable on November 16.

OLYMPIC PORTLAND CEMENT.—The directors have declared an interim dividend of 5 per cent., less tax, payable on November 14.

NITRATE RAILWAYS CO., LTD.—Details of a scheme for an increase of the company's capital are expected to be published shortly.

BURMAH OIL CO.—November 11 is the date on which an interim dividend of 12½ per cent., less tax, for the year ending December 31, 1925, is payable.

LAUTARO NITRATE CO., LTD.—Out of the profits for the current year the directors have declared a final dividend of 5 per cent., less income tax, making 15 per cent. for the year.

VAL DE TRAVERS ASPHALTE PAVING CO., LTD.—An interim dividend of 6d. per share, less tax, for the half-year ended June 30, being at the rate of 5 per cent. per annum, is payable on and after November 9.

LEEDS FIRECLAY CO.—The trading profits for the year ended June 30 were £44,033 and £9,704 was brought forward. A dividend of 5½ per cent. is proposed on the ordinary shares, carrying forward £15,743.

SALAR DEL CARMEN NITRATE SYNDICATE, LTD.—The directors have declared an interim dividend of 5 per cent., less tax, on account of the profits for the current year. A similar dividend was paid a year ago.

CENTRAL OIL AND CHEMICALS TRUST, LTD.—A statement respecting the company was published on Monday. Formerly known as The Central Oil and Gas Trust Ltd., incorporated in 1911, the company has an authorised capital of £700,000 issued in shares of £1 each, fully paid.

R. WHITE AND SONS.—This company of mineral water manufacturers propose a 100 per cent. share bonus on the ordinary shares. The ordinary share capital was formerly £500,000, but has been reduced during recent years to £82,000, and it is now proposed to capitalise £82,000 of the reserve.

ERINOID, LTD.—For the year ended August 31 last the trading profits amounted to £58,746, and after allowing for depreciation of plant and machinery, the net profits were £48,748. The directors recommend a final dividend of 7½ per cent., making 12½ per cent. for the year, less tax at 4s. 2d. in the £.

SADLER AND CO., LTD.—After charging income tax, interest on prepaid shares and directors' and auditors' fees, the profit for the year ended June 30 last amounted to £13,927, plus balance from last year £14,416, making a total of £28,343. A final dividend of 4 per cent. is proposed, making 7 per cent. for the twelve months, and £10,000 is set aside for depreciation, leaving to be carried forward £9,098.

BRADFORD DYERS' ASSOCIATION.—At a special meeting on Monday approval was given to the capitalisation of £813,886 (a portion of the £1,125,000 standing to the credit of the reserve fund), and the addition of three new ordinary shares to every five similar shares now held. The creation of 500,000 preference and 500,000 ordinary shares of £1 was also sanctioned.

ANGLO-CHILEAN CONSOLIDATED NITRATE CORPORATION.—On Monday $16,500,000 twenty year 7 per cent. sinking fund debenture bonds of the Corporation were offered in New York by a syndicate headed by Lehman Brothers, Goldman, Sachs and Co., and Blair and Co. The bonds carry the right to receive, without cost, common stock at the rate of 7½ shares for each $1,000 debenture bond offered at par.

ELECTROLYTIC ZINC CO. OF AUSTRALASIA.—The gross profit for the past year was £510,073 and the net profit amounted to £375,380. The total amount available is £474,301, which is appropriated as follows:—£12,100 to debenture sinking fund reserve, £20,000 written off investigational and general development account, £20,000 towards new plant for West Coast mines, £40,000 carried to credit equalisation reserve, £216,269 in payment of dividends 6 and 7, leaving £165,932 to be carried forward.

BRITISH CYANIDES, LTD.—The accounts for the year ended April 30 last, show a loss of £18,716, to which must be added the balance of loss brought forward of £11,568, making a tota loss of £30,284 to be carried forward. The directors state that developments in respect of the Beetle Products Co., Ltd., are progressing satisfactorily, but its operations have not yet arrived at a stage at which this company has begun to feel the benefit. The annual meeting will be held at 49, Wellington Street, Strand, London, on October 28, at 12 noon.

EVANS, SONS, LESCHER AND WEBB, LTD.—A scheme providing for the liquidation of the company and the formation of a new company with a capital of £450,000, divided into 1,350,000 shares of 6s. 8d. each, was sanctioned by the Lancashire Chancery Court at Liverpool on Monday. Under the scheme, which has received the approval of debenture holders and shareholders, the 300,000 ordinary £1 shares are to be exchanged for new 6s. 8d. shares, each to be credited as paid up to the extent of 4s. only, the balance of 2s. 8d. per share to be paid in cash. There are also to be issued 300,000 new ordinary shares.

AMERICAN CELLULOSE AND CHEMICAL CO., LTD.—It is announced that the company is offering to present common stock holders additional shares of its stock in 1,000 blocks, each block consisting of nine fully paid and non-assessable shares of 7 per cent. cumulative first participating preferred stock of the par value of $100 each, and five fully paid and non-assessable shares of common stock of no par value. The subscription price is $1,020 for each block, of which $117 per block will be set aside in a special reserve for equalisation of dividends on the preferred shares. Payment of the subscription price may be made in London at the office of Robert Fleming and Co., 8, Crosby Square.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LUBRICATING OILS.—Tenders are invited by the State Electric Works at Montevideo for the supply of 152,000 kilograms of lubricating and transformer oils of various densities, to be received in Montevideo by January 14. (Reference, B.X. 2,099.)

CHEMICALS, ETC.—Tenders are invited by the State Electricity Supply Works at Montevideo for the supply of 100 kilogs of commercial sulphuric acid, in jars of 25 kilogs, 3,000 kilogs of granulated calcium carbide, in drums of 50 kilogs, 50 kilogs of special quicksilver for electrical use, 500 kilogs of best black oil paint in paste, in pots of 9 kilogs, 5,000 kilogs of crystallised soda, in kegs of 100 kilogs. Closing date for tenders in Montevideo is January 5, 1926. Local representation is essential. (Reference C.X. 1,774.)

TAR.—Tenders invited for the supply and delivery of 40,000 gallons of dehydrated or refined tar complying with Ministry of Transport's specification for Strood Council. Tender forms from Mr. L. Randerson, Meopham, Gravesend, to be returned by November 5.

IRON AND STEEL, ETC.—A commission agent in Copenhagen desires to secure the local representation of British manufacturers of black and galvanised iron and steel plates, sheets, bars, etc., and rubber and asbestos steam packing materials. (Reference No. 456.)

ARTIFICIAL SILK.—A Chinese merchant in Shanghai is desirous of receiving samples and prices from British manufacturers of artificial silk piece-goods. (Reference No. 480.)

SULPHATE OF COPPER, FISH OIL.—A firm in Bordeaux desire to secure the agency, on a commission basis, of British exporters of sulphate of copper and fish oil. (Reference No. 457.)

COPPER AND BRASS TUBING, ETC.—An agent at The Hague desires to represent, on a commission basis, British manufacturers of copper and brass tubing and similar lines. (Reference No. 469.)

Latest Government Contracts

RECENT Government contracts in the various departments include:

Admiralty

CIVIL ENGINEER-IN-CHIEF'S DEPARTMENT. — Creosoted Sleepers: Calders, Ltd., London, W. Creosoted Timber: Plymouth and Oreston Timber Co., Ltd., Plymouth. Portland Cement: Smeed, Dean and Co., Ltd., Murston, Sittingbourne.

CONTRACT AND PURCHASE DEPARTMENT.—Gelatinising Machine, Modifications to: Greenwood and Batley, Ltd., Leeds. Nitro-Cellulose Plant: Masson Scott and Co., Ltd., London, S.W.

War Office

Acetylene Gas: Allen-Liversidge, Ltd., London, S.W. Aluminium Alloy: British Aluminium Co., Ltd., Stoke-on-Trent. Cresoli: Jeyes Sanitary Compound Co., Ltd., London, E. Oil, Lubricating Mineral: British Oil and Turpentine Corporation, Ltd., Hayes, Middlesex. Paint, Ground in Oil: Alex. Fergusson and Co., Ltd., Glasgow.

Air Ministry

Fire Extinguishers: The Pyrene Co., Ltd., London, S.W. Oil, Lubricating: Sterns, Ltd., London, E.C. Oils, Various (Iraq): F. How and Co., Ltd., London, E. Photographic Stores: Houghton-Butcher Manufacturing Co., Ltd., London, E.; Williamson Manufacturing Co., Ltd., London, N.W. Turpentine: J. Arnott and Sons, Ltd., Newcastle.

Post Office

Chloride of Manganese: F. S. Bayley, Clanahan and Co., Manchester.

H.M. Stationery Office

Carbonic Paper: Ellams Duplicator Co., Ltd., Bushey; Waterlow and Sons, Ltd., Dunstable. Gum Arabic: T. Tabberner and Co., Manchester. Waxed Stencil Paper: Ellams Duplicator Co., Ltd., Bushey.

Crown Agents for the Colonies

Cells, Lux: The Chloride Electric Storage Co., Ltd., London, S.W. Cement: Cement Marketing Co., Ltd., London, S.W.; T. Beynon and Co., London, E.C. Disinfector, Steam: Manlove, Alliott and Co., Ltd., Nottingham. Insulators, Porcelain: Taylor, Tunnicliff and Co., Ltd., Hanley, Staffs. Izal: Newton, Chambers and Co., Thorncliffe, Sheffield. Lead, Pig: R. M. Easdale and Co., Glasgow; Locke, Lancaster and W. and R. Johnson and Sons, Ltd., London, E.C. Novarsenobillon: May and Baker, Ltd., London, S.W. Paints: Red Hand Composition Co., Ltd., London, E.C.; Mersey White Lead Co., Warrington; Locke, Lancaster, and W. and R. Johnson, Ltd., London, E.C.; Torbay Paint Co., London, E.C. Quinine: Howards and Sons, Ilford. Tarpaulins: Waterproofing Co., Ltd., London, S.W. Varnish: R. Kearsley and Co., Ltd., Ripon.

B.D.C. New Colours

THE new sample colours issued by the British Dyestuffs Corporation include a series of attractive autumn and winter shades, particularly suitable for dress goods. Attention is drawn to the level dyeing acid colours, which work well in combination, and produce shades of very good fastness to light. Eight samples of suggested shades are given, but the company are prepared to supply recipes for the matching of any desired shade. An interesting addition to the existing range of yellows is the B.D.C. leather yellow paste, for the dyeing of full-chrome, semi-chrome, and vegetable tanned leathers and for brush-staining work. This paste is said to possess good solubility and level dyeing properties, and particularly good fastness to light. Although the dyed shade is, in itself, a brownish yellow for which at present there may be only a limited demand, the use, it is thought, of leather yellow paste as a chief component of browns is likely to be extensive.

Du Pont Rayon Developments

NEW plant costing between $8,000,000 and $10,000,000 will be constructed at once by the Du Pont Rayon Co., in Buffalo, U.S.A., which will triple the capacity of the local plant. With the new unit at Buffalo and increased production at Nashville, the du Pont Rayon Co. will have a total output of 20,000,000 lb. of rayon annually.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette, &c.

Company Winding Up Voluntarily

THAMES BANK CHEMICAL WORKS, LTD. (C.W.U.V., 24/10/25.) C. H. Whatley, 6-7, Charing Cross Chambers, Duke Street, Adelphi, W.C.2, appointed liquidator. October 13.

Application for Discharge

PAYNE, Ernest Edward Munro (described in the Receiving Order as Edward Ernest Munro Payne), "Red House," Narborough, Leicester. Analytical chemist. (A.F.D., 24/10/25.) Hearing, November 12, 10 a.m., The Castle, Leicester.

Partnerships Dissolved

CHARLES AND FOX (Louis Ellison PRITCHITT and Herbert Ernest HOREY, chemical merchants, 3, Mincing Lane, London, by mutual consent as from October 14, 1925. Debts received and paid by H. E. Horey.

JONES AND CO. (Henry George JONES and Sir Henry James HALL), methylated spirit makers, Copperfield Road, Bow, London, by mutual consent as from December 31, 1924. Debts received and paid by H. G. Jones.

Receivership

NORWOOD WHARF CHEMICAL CO., LTD. (R., 24/10/25). F. R. Justsum, of Wychling, Morgans Lane, Hayes End, was appointed receiver and manager on October 12, under powers contained in debenture dated March 9, 1925.

New Companies Registered

BOARSHAW BLEACH WORKS, LTD., Brook Street, Middleton. Bleachers, printers, dyers, etc., manufacturers of and dealers in salts, acids, soaps, alkalis, drug colours, etc. Nominal capital, £10,000 in £1 shares.

BRITISH VISADA, LTD., Python Mill, Littleborough, Lancs. Artificial and real silk mercers and manufacturers, spinners, etc., bleachers, dyers and finishers, manufacturers of and dealers in viscose, cellulose, etc. Nominal capital, £360,000 in 300,000 10 per cent. non-cumulative preferred ordinary shares of £1 and 600,000 deferred ordinary shares of 2s.

BUHRINGS FILTERS, LTD., Wardrobe Chambers, 146A, Queen Victoria Street, London, E.C.4. Filter carbon manufacturers, carbon manufacturers, filter manufacturers, etc. Nominal capital, £1,500 in £1 shares.

COMMERCIAL OIL RESEARCH SYNDICATE, LTD., 24, Martin Lane, Cannon Street, London, E.C.4. To conduct and carry out research work in fats and oils of all kinds; refiners and blenders of oils and fats; chemists, druggists, drysalters, oil and colourmen, etc. Nominal capital, £100 in £1 shares.

UPHOLLAND COKING AND BY-PRODUCTS CO., LTD.—To enter into an agreement with Benzol and By-Products, Ltd., for the acquisition of certain freehold land, buildings, plant, and mineral rights at or connected with the Mountain Mine Colliery, at Upholland, Lancs, and to search for, win, get, work, sell, and deal in coal and other minerals, metals, etc. Nominal capital, £5,000 in £1 shares. Solicitors: Clifford Turner and Hopton, 81, Gresham Street, London, E.C.2.

Another New Building Material

THE waste from the manufacture of Java sugar is to form the basis of "Celotex," a new building material, according to reports from Holland. The material is manufactured in sheet form, and is said to have excellent insulating properties. At present the price is 2.25 florins per sq. metre, but it is anticipated that large production at works near sugar factories would greatly reduce the cost.